The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. IV. APRIL 9, 1921 No. 95

Contents

Editorial Notes: Financial Resolutions Postponed; The B. D. C. Meeting; French Potash; Impurities in Power Alcohol; Sir John Benn 413
The Calendar 415
Materials of Construction Used in a Chemical Works.—(II.) By GEORGE B. JONES, A.M.Inst.C.E., A.I.C. 416
Potash Supplies from Alsace: M. Lenoble's Visit 418
Muriate or Sulphate of Potash. (JOHN HUGHES, F.I.C., and "CHEMIST") 419
Fertilising Value of Magnesium Salts. ("FERTILISER") ... 420
Flotative Re-agents. (W. A. HAMOR) 420
Scientific Principles of Cold Storage 421
Society of Chemical Industry: Manchester, Liverpool and Newcastle-on-Tyne Sections... 421
Association of Industrial Chemists 422
From Week to Week 424
References to Current Literature... 425
Patent Literature 426
Chemical Matters in Parliament 428
Monthly Market Report and Current Prices 429
Company News; Chemical Trade Inquiries 432
Commercial Intelligence 433
New Companies Registered 434

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- abroad. Cheques, P.O.O.'s, and Postal Orders should be made payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4. Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).

Financial Resolutions Postponed

THE decision of the Government, announced in the House of Commons on Tuesday, to postpone the consideration of the Ways and Means Resolutions for the safeguarding of industries need not be taken as a weakening in the attitude of the Government, though the interval will almost certainly be used to encourage the Opposition. The postponement is sufficiently explained by more urgent problems with which the Government are confronted. The most anxious, for the moment, is the coal crisis. Already damage has been caused to the mines which cannot be repaired within months. It seems as if some malevolent microbe were at work in the minds of the men's leaders, perverting both their judgment and the sense of moral responsibility which is usually robust in our working classes. Each step taken ostensibly to improve or to maintain their own position leaves us all—themselves no less than the rest of the community—worse off than before. How long the nation can afford to be let down in this blind fashion no one can say; but there is obviously a limit. And the exasperating feature about it is that the chances of recovery are steadily being made more difficult and remote.

As to the Resolutions themselves, it would be idle to pretend, however well we may wish our recently established industries, that they are not viewed with serious misgiving. It is one of the difficulties of protective legislation that it must go all round or leave the industries excluded dissatisfied. The industries included in the Ways and Means Resolutions have just the same right to ask for preference as the dyestuffs industry had. The list is fairly long, but it does not include all who think they are entitled to inclusion. Moreover, it is doubtful whether the imposition of a Customs duty equal to 33⅓ per cent. of the value of goods imported would be sufficient protection in all cases. It would help, no doubt, but it is admitted that in some cases nothing short of prohibition would suffice. In that case the cost of supporting the industries would ultimately take the form of higher costs to consumers in this country with even the possibility of inferior quality. It is conceivable that such a price may have to be paid, but it is a point which people are very seriously pondering.

Another matter which is causing concern is the comprehensive powers which these Resolutions vest in the Board of Trade, which means, of course, in the permanent officials. The President and Parliamentary Secretary are mere birds of passage. Even where they are strong enough to force their will on the staff, their stay is too short to enable them to do much. More and more, therefore, the management of trade is becoming bureaucratic, and it will not be surprising if some measure of reaction soon begins to assert itself. In connection, for example, with the chemicals included in Resolution I, these are to include "any articles comprised in any list which may from time to time be issued by the Board of Trade." There is apparently to be no finality in the process. A list of to-day may be enlarged or restricted to-morrow at the discretion of the permanent staff, with the result that the trade will never know from month to month where it is. As a result of these impending regulations business is being suspended and harassed, and recovery of trade is hindered instead of being helped.

The B.D.C. Meeting

THE official report of the second ordinary general meeting of the British Dyestuffs Corporation discloses nothing of an exceptional nature. Whether this is due to judicious reticence on the part of the publicity department or to the fact that nothing really out of the way happened only those present can say. We learn from the chairman's address that the system of dual control by two managing directors contained elements of weakness, that the board after very careful thought and deliberation brought it to an end, and that the two gentlemen who occupied those positions are now ordi-

nary members of the Board. One might imagine from so casual a statement of what occurred—with the names of the two managing directors not even mentioned—that these changes were of the most trifling character. Then, again, some important amendments to the directors' proposals were moved and defeated, but these are briefly recorded as mere incidents. The policy of not disclosing any more than was necessary of internal disagreement is, of course, the wise and proper one in the Company's interests, but only a little imagination is needed to appreciate the position which has made necessary the drastic changes so nonchalantly reported to the meeting.

The public concern, however, is less with the disunion which has obviously existed within the management than with the new plans of reorganisation which have been decided on. For the present the executive powers of the Board are vested in Sir Henry Birchenough, assisted by Sir William Alexander, a distinguished administrator of productive departments during the war, and Mr. Vernon Clay, who, as chairman of the Colour Users' Association, should bring the Corporation methods more closely into accord with users' needs and practices. Beyond this Sir William Robertson, an experienced and successful military administrator, joins the Board. Even these are not the only changes. It is the intention presently to appoint a single individual to take charge of the Corporation's operations and staff. Probably on this single official more than on any one else will depend the future of the Corporation's work, and the appointment will be awaited with great interest.

While one can only conjecture as to the inner meaning of all this, it would seem from the character and position of the men now added to the directorate that the aim is to nationalise the concern in a sense not hitherto achieved or even perhaps attempted. The directorate rather suggests in its personnel the permanent staff of a great Government department, and it remains to be seen how far experiences of military and public administration will strengthen the Corporation on its commercial and technical sides. The greatest chemical concerns we possess have been developed by private enterprise, while some of the Government schemes taken up during the war were lamentable examples of official inefficiency. It may be that the changes already made and yet to be made will secure a combination of the best qualities of Government administration, private commercial enterprise, and scientific and technical equipment. If so, they will be welcome, for it must be confessed that, considerable as the results are which have been attained, the Corporation has in some ways been a disappointment. That it is intended to run the business more as a national concern than hitherto is clear from the Chairman's statement that the shareholders are not investing in an ordinary commercial venture. In addition to their duty to the shareholders, all who co-operate in carrying on the work of the Corporation owe a chief obligation to the State. Henceforth, then, we may take it that the management of the Corporation will be directed primarily to the national interests, and on this ground its policy will in the future have to be considered. How far it is intended that the Corporation should be solely relied on by the State for the foundation of a national dyestuffs industry no one can at present say, but the policy of putting all one's eggs into one basket has obvious disadvantages, and while the national interest requires the nation's best assistance to be given to the Corporation's work it may equally require the recognition and support of initiative outside the Corporation's organisation.

French Potash

THE visit to London last week of M. Lenoble, general manager of the Société Commerciale des Potasses d'Alsace, gave an opportunity for reviewing the present position of the French potash industry and for learning from a representative company of British firms interested in the manufacture or distribution of fertilisers their view of the situation. The impression produced was entirely favourable. M. Roudolphi, the general manager of the Alsace-Lorraine Development and Trading Co. quoted figures which leave no doubt as to the progress made in the introduction of French potash to this country. The output, he stated, from the Alsace mines under German control, was in 1913, the last complete year before the war, 87,000 tons of pure potash (K_2O). In 1919 it was 90,000 tons, the French figures beginning practically where the German ended, but in 1920 it had increased to 200,000 tons, and this year it is expected to reach 300,000 tons. The increase in the imports of Alsatian potash salts into this country is equally striking. The shipments, which in 1919 amounted to 15,000 tons, reached last year a total of 100,000 tons. This progress may be explained on three grounds. The first is the vigour of the British management in putting the case for Alsatian potash before the public. The second is the fact that Alsatian potash claims to compete on economic terms with other potash supplies, and the extent to which its distribution in this country has grown shows that this claim is recognised by a considerable body of the trade. The third is the bond between Great Britain and France formed during the war. Business is not likely to be controlled purely by sentiment, but economic and other conditions being fairly equal the sentiment of alliance may be a powerful commercial aid in predisposing people to trade with our French allies, who have suffered so heavily in the war, and whom it is natural we should wish to help in the recovery and development of their national trade.

So far the Alsatian potash question has been a matter of producing in France and distributing in this country and the Colonies. But an important new development may presently follow. It was hinted at the gathering which M. Lenoble attended that arrangements might be possible for shipping crude potash from Alsace into this country and setting up British works for all the processes of subsequent treatment. Whether this proposal can be brought within the definition of a key industry and on that ground can obtain preferential treatment over rival supplies is at present an unsettled point. We believe it has been put before some of our authorities, but apparently has not been accepted so far, since potash is not included in the Financial Resolutions issued last week. Whether or not potash manufacture is to be regarded as a national industry entitled to preferential treatment, the idea of setting up large potash works in this country for the supply for ourselves and our Colonies has decided attractions.

We are informed by competent judges that experiments already made are favourable, that negotiations between French and British interests have reached a certain point, and that the idea may easily take at no distant date effective commercial shape.

Impurities in Power Alcohol

Now that the difficulties in connexion with the large-scale production of alcohol from the ethylene in coke-oven gas have been overcome, the time has arrived for the thorough consideration of the impurities in the spirit and the effect on the latter of the impurities in the gas. It seems to have been definitely ascertained that for the recovery of a suitable alcohol the synthetic process must be applied to clean gas, that is to say, at a stage if possible after the ordinary oxide of iron purifiers. If gas containing sulphuretted hydrogen is treated it is found that loss of efficiency results, in that a portion of the ethylene (instead of yielding alcohol) is consumed in the formation of diethylene disulphide, acid is decomposed, and impurities make their appearance in the spirit. The problem of removing the whole of the sulphuretted hydrogen by means of oxide of iron from coke-oven gas is not a simple one, for although chemically there are few difficulties, the apparatus in the case of large streams of gas would have to be of considerable bulk and would, accordingly, entail an appreciable expenditure. Moreover, even with sulphuretted hydrogen eliminated, there still remains the very complicated problem of other sulphur compounds, although the effect of these does not appear to be serious.

Mr. Cecil Tidman has recently drawn attention to an alternative method of purification which is dependent upon the well-known reaction between sulphur dioxide and sulphuretted hydrogen resulting in the formation of free sulphur and water. The application of the reaction in practical working is, however, by no means simple, and very much would appear to depend upon the adjustment of the sulphur dioxide stream. For instance, with the sulphur dioxide rather short of the actual amount required very little decomposition of the sulphuretted hydrogen takes place. With just the theoretical quantity required it is found that less than 50 per cent. of the sulphuretted hydrogen is removed even with a 15 minutes' time contact. Accordingly, the conclusion has been arrived at that it is essential to work with a large excess of sulphur dioxide if complete decomposition is to be effected. Later experiments have shown, however, that a considerable improvement follows the use of liquid sulphur dioxide in lieu of the gas. Operating with the coke-oven gas and liquid sulphur dioxide in counter current, purification was easily effected so long as the SO_2 was present in excess. The exact excess necessary is still a matter to be decided. A large proportion of it is apparently not lost but is carried forward in the gas stream, where it may ultimately be removed by scrubbing with water and re-used again in the de-sulphurising tower.

Sir John Benn

THE distinguished company which met at the Connaught Rooms on Thursday, at a complimentary luncheon given to Sir John BENN, was in itself as fine a tribute as any public man might wish to the work of a long public life. Himself the "Father" of the London County Council, and the only surviving member of the original body who still sits on it, Sir John was surrounded by a group of notable figures, who served with him in starting the London County Council on its work and in making it in many ways a model of municipal government on a large scale.

The occasion was not only notable, but even almost historic, for one could hardly imagine another which could bring together so vividly the representative types—mainly Liberal and Nonconformist, but all emphatically progressive—which constituted the first body. The Marquis of Lincolnshire, who presided, proposed the health of Sir John, who sketched lightly in review in his reply the aims and achievements of the Council. The toast of "London" was proposed by Dr. Clifford and Lord Riddell, and responded to by the Marquis of Crewe, and Lord Burnham closed the list by proposing the toast of "The Chairman." It was a tribute of an unusually representative kind, and one which both Sir John and Lady Benn may be excused for regarding with real pride and gratification.

The Calendar

April		
9	Mining Institute of Scotland: Annual General Meeting: Papers by D. Penman; H. M. Cadell; Professor H. Brigg. 3 p.m.	Royal Technical College, Glasgow.
9	Royal Institution: "Poisons and Antidotes," by Dr. H. H. Dale. 3 p.m.	Albemarle Street, Piccadilly, London.
11	Royal Society of Arts: "Recent Applications of the Spectroscope and the Spectrophotometer to Science and Industry," by S. J. Lewis. 8 p.m.	John Street, Adelphi London.
11	Royal College of Science for Ireland: Chemical Association: "Carbon Sub-Oxide," by N. MacNeill. 4.30 p.m.	Royal College of Science, Dublin.
12	The Sheffield Association of Metallurgists and Metallurgical Chemists: "The Effect of Various Elements on the Electrical Resistivity of Steel," by J. Woolman.	Sheffield.
13	Royal Society of Arts; "Low Temperature Carbonisation and Smokeless Fuel," by Professor H. E. Armstrong. 8 p.m.	John Street, Adelphi London.
14	Royal Society: Papers by Sir R. Hadfield, Professor K. Onnes, Dr. W. R. Weltier; C. N. Hinshelwood, E. J. Bowen; N. K. Adam; E. P. Metcalfe, B. Ven Katesachar	Burlington House, Piccadilly, London.
14	Oil and Colour Chemists' Association: "Indian Products of Interest to the Oil and Colour Chemist," by F. H. Barry. 7.30 p.m.	Food Reform Club, 2, Furnival Street, London.
14	Institute of Chemistry ...	Liverpool.

Books Received

REPORTS OF THE PROGRESS OF APPLIED CHEMISTRY: Society of Chemical Industry, V. 1920. Pp. 640. 8s. 3d. to Members; 15s. to non-Members.

MODERN CHEMISTRY, PURE AND APPLIED. By Arthur J. Hale. Vol. I.-II. London: Virtue & Co. Ltd. Pp. 272-276. 16s. net each vol.

Materials of Construction Used in a Chemical Works—(II)

By George B. Jones, A.M.Inst.C.E., A.I.C.

The following article deals with a subject upon which, as it directly concerns the chemist, very little literature has appeared. Perhaps, the appearance of structures in many of our older chemical works is the best illustration of the fact that the choice of structural materials has not always been as happy as it might have been.

Fused Silica Ware

A large variety of articles made of fused silica or quartz can now be obtained. This material is made in an electric furnace from raw quartz of 99·8 per cent. purity. The material does not attain a fluid condition, but is moulded to the required shape while in a plastic condition. The inside of the finished article has a glaze non-porous to gases, except hydrogen at high temperatures, but the outside is rather rough and covered with minute air bubbles. It is highly refractory, and retains its full strength up to 1,100°C. It has an extremely small co-efficient of expansion—only about one-seventeenth of that of glass, and to this fact it owes its property of being able to withstand sudden changes of temperature without any danger of breakage. It also has excellent electrical insulating properties. It has, however, no great mechanical resistance and requires special means of support in the same way as the special cast-iron alloys; its specific gravity is about 2·07. As regards its acid-resisting properties, it is unattacked by practically all acids, hot or cold, except hydrofluoric acid, and phosphoric acid above 400°C. This material has been extensively used for condensing and cooling apparatus where acid fumes have to be handled; pipes up to 15 in. diameter and 3 ft. 6 in. long can readily be made. Spigot and socket joints should be used. It also has a large use for boiling pans and basins used for concentrating acids. Worm coils of 2 in. bore and up to 60 ft. in length can be made all in one piece.

Glass has many useful applications, especially for making pipes to convey small quantities of nitric or hydrochloric acid or hot hydrochloric acid gas up to 200°C. Glass tubes can be made up into excellent coolers, as the tube walls are thin with consequent good heat transmission. Small specially shaped connections can easily be made by bending glass tubing, but great care should be taken to properly anneal the glass before use, for unannealed glass readily fractures under strain or changes of temperature. The most satisfactory method of joining two pieces of glass tubing is by means of a loose collar of glass or porcelain packed with soft asbestos putty to allow for any expansion. Glass sockets often fail through bad annealing. Glass has a high crushing strength, but is weak in tension, and will only stand about 1¼ tons per square inch, therefore it must be well supported.

Stoneware, Bricks and Tiles

Chemical stoneware is made of a mixture of several clays selected to produce a substance of porcelain-like character. The material must be of uniform composition, and free from cracks when burnt. It must also be capable of taking a polish so that cocks and plugs may be ground in to fit tightly. Very large vessels cannot be made in one piece—one about 300 gallons is the maximum for reliability—as the material is apt to warp when being dried and burnt. The articles are usually finished with a glazed or enamelled surface, which can be made to stand hot aqua-regia if necessary. Stoneware is made up into pumps and blow eggs for handling hydrochloric and nitric acids, as well as into tanks, jars and pipes for general use.

Earthenware and clay ware are also used, especially for hydrochloric acid gas and weak acid tanks. In this case it must be well glazed, for if the acid soaks into the pores the material becomes disintegrated. Unglazed pipes, however, if well boiled in tar, stand hot hydrochloric acid gas. Ordinary sanitary pipes are not very satisfactory when used for corrosive chemicals.

Bricks and tiles are used in a chemical works for many purposes, and four distinct types of material have to be used for :—

(*a*) Ordinary building bricks;
(*b*) Fire bricks;
(*c*) Vessel linings to stand acids, with or without heat.
(*d*) Vessel linings to stand alkalis, with or without heat.

Classes (*a*) and (*b*) are well known, and need no special description here. Bricks to stand the action of alkalis must contain an excess of basic material; silica bricks are not suitable. Fire bricks on the whole resist alkalis very well, and a good Stourbridge brick will stand alkalis and heat as well as any. A good blue brick is useful for places where the temperature is not above the normal. Bricks to resist acids and heat must be well burnt and have a perfectly vitrified surface. Many excellent bricks are made from the Buckley clay in North Wales; they contain 65 to 75 per cent. silica, 15 to 25 per cent. alumina, and about 5 per cent. iron. Staffordshire blue bricks when well vitrified are practically unattacked by strong acids; they contain about 60 per cent. silica, 23 per cent. alumina, and 11 per cent. iron. All these bricks should only have their original surfaces exposed to the attack of fumes and acids, as all cut surfaces are much more liable to corrosion. Pure silica bricks often swell under the action of acids; but there are several patent vitreous silica bricks, such as Obsidianite, on the market, and these are non-porous, acid proof, and heat resisting.

Tiles for lining vats, tanks, blow eggs, &c., can be obtained to withstand the action of practically all commercial corrosive liquids. The Accrington Red Brick is a good example which is excellent for linings to stand sulphuric acid and oleum. Tanks with built-up linings can be made in almost any size. These linings require very careful fitting, and special and suitable jointing material must be used in each particular case. If the corrosive liquid gets through a joint and behind the lining of a steel or cast-iron tank, and the metal is attacked, the corrosion compound formed pushes the lining away from the tank sides, and finally causes it to collapse. Bottom connections to a tile-lined tank are always a source of trouble, as it is difficult to make a tight joint between the tank lining and the pipe connection. Pumps, cocks, and pipes can also be made with a lining of acid-proof ware.

Tanks and other articles can be readily protected against corrosion by coating all exposed surfaces with an enamel which is completely resisting. Enamelling requires to be perfectly done, and great care taken not to chip or break it, for one minute pin-hole will let the corrosive liquid get behind and destroy the vessel. This method of protection, however, is especially useful for moving parts of plant, such as stirring gear, which could not be very successfully lined with tiles or lead.

Natural stone is largely used for towers and tanks exposed to hydrochloric acid; nitric and sulphuric acid both have more action on stone, and good artificial stoneware should always be used for these two acids. Yorkshire stone from near Halifax probably has the best acid-resisting properties; it contains about 90 per cent. of silica, and should be free from such impurities as lime and pyrites, which are easily attacked and cause pieces to flake off. The durability of a particular stone is a function of its porosity, so only non-porous varieties should be used. Stone is very liable to crack suddenly if exposed to changes of temperature. Joints between sections of a stone tank require carefully making, and india rubber cord, fitting into two grooves with the stones held together by clamps, is as satisfactory as anything.

Volvic stone, which is obtained from beds of lava, is largely used for towers in which sulphuric acid is concentrated, and gives excellent results.

Jointing Materials

The economic life of a vessel or pipe line exposed to the action of chemicals largely depends on the life of the material forming the joints between its various parts. The most suitable material must be used in each case, and skill must be exercised in making the joint if good results are to be obtained. A leaky joint not only means a loss of chemical material, but also external corrosion of the plant, which is usually unprotected except by paint. All flanges should be machine faced,

and as a general rule the thinner the joint the longer it will stand. Spigot and socket joints require special consideration, especially for pipes made of brittle materials. If the pipes are liable to be taken down often for repairs or cleaning a soft jointing material must be used, which can easily be picked out without damaging the socket.

India-rubber is not very extensively used, as nitric acid readily destroys it, and only dilute sulphuric acid and hydrochloric acid can safely be exposed to it. Many chemicals and solvents attack it, but vulcanite and ebonite are useful for lining vessels to resist many chemicals, including hydrochloric acid at ordinary temperatures.

Asbestos is a most useful jointing material, but it requires suitably treating before use. Sulphuric acid and oleum joint flanges can be successfully made with asbestos sheet soaked in silicate of soda. Red lead must not be used.

For spigot and socket joints of silica, earthenware or acid-resisting cast-iron pipes, a good soft putty is made from :—

Asbestos powder	40	parts
Asbestos fibre	8	,,
Tallow	3	,,
China clay	20	,,
Boiled linseed oil	20	,,

The socket should be packed with two or three rings of asbestos rope or fibre and then filled up with the soft putty.

For nitric acid stills and condensers an excellent putty can be made from asbestos powder kneaded into a dough with a strong solution of silicate of soda (water glass). This putty should only be made as required, as it sets hard. It is advisable to rub over the face of the joint with a little free acid before finishing, as this sets free silica and provides a hard impervious skin.

Hard putty for sockets or glass joints can be made from a mixture of barytes and silicate of soda, or a mixture of flint dust and silicate of soda. These putties set very hard and cannot be removed from the joint.

Rust joints are useful for cast-iron retorts, and are made with iron borings mixed with about 1 per cent. of salammoniac.

There are many kinds of black putty made up with tar, which have good acid-resisting properties. A soft putty can be made from china clay, linseed oil and tar ; a paste for screwed pipe joints can be made from barytes and tar.

Sulphur is also used for making jointing materials, and a typical one to stand hydrochloric acid gas can be made by mixing one part of sulphur, one part of resin and two parts of powdered volvic stone.

General Building Materials

All types of general building materials are used in chemical works, from corrugated iron sheets to heavy ferro-concrete. Some branches of the chemical industry justify the erection of large permanent brick sheds, while others only require buildings of a lighter structure. Manufacturing methods soon become obsolete, and if permanent buildings are put up they should be of such a design that they could be easily adapted to house new plant and processes. For this reason it is doubtful whether ferro-concrete should be extensively used. Concrete floors are not easily cut to permit new pipe lines to pass through, concrete also cannot readily have light fixtures fastened to it. Timber structures and floors, well protected by asphalt if exposed to acid corrosion, and steel structures with light plate floors are very adaptable to plant alterations and additions.

Concrete of course is attacked by all acids, and it is often difficult to properly protect foundations for pumps and motors which are liable to be exposed to chemicals or oil. The foundations of buildings used as stores for acid chemicals or near which acid liquids are likely to soak into the ground require very special treatment. There are many kinds of waterproofing and acid-resisting materials on the market for coating and protecting concrete. These consist of asphalt or other bituminous material, varnishes, &c., which simply cover the concrete, and chemical protectors, either mixed with the concrete before pouring, or applied to the surfaces, which combine with the concrete, and render it water, oil, acid, or alkali-proof as the case may be. Large underground pits and store tanks can be made quite watertight and corrosion proof by lining the concrete inside with a layer of asphalt, and then with a layer of concrete or acid-resisting bricks as the circumstances may demand.

Brickwork exposed to acid fumes should have the face brick joints for 4½ inches deep made with an acid-resisting cement, such as brick dust and silicate of soda. Furnace flues and chimneys conveying hot gases containing a proportion of acid gases should have all the exposed joints of the firebrick work made with best fireclay, but when the gases are likely to be cooled below the dew point and deposit acid condensate, a lining of acid-resisting bricks laid dry is probably the best means of protection.

Ground floors of buildings and areas requiring paving should be laid with hard acid-resisting or blue bricks set in pitch or sulphur and sand. All paving should be laid with a good fall towards a drain, so that any spilled chemicals can be at once washed away. Drains and culverts for acid effluents should be lined with acid proof materials, properly jointed, and made watertight by an internal layer of asphalt.

Timber is extensively used, as it is easily wrought, light in weight, is a good ground for receiving fixtures, and can easily be made corrosion proof by creosoting or boiling in tar before erection. Timber of course has the objection of being inflammable. Pitch pine is the best among the common timbers to resist chemical fumes and weather, but it twists under the action of temperature variations. Red and white pine are very commonly used, the latter being useful when the timber is exposed to heat, as it does not twist very much. Timber tanks and tubs for liquids should always be kept wetted, to prevent drying and shrinkage. They can be used for neutral and slightly acid liquids, but not for alkaline liquids, as these have a strong action on wood. Teak, oak, chestnut and cypress are the best woods for tubs, but pitch pine and red deal tubs last very well if properly made. Kauri pine always makes a tight tub, as it expands when wetted. Wooden tanks should be quite dry and well tarred before lead lining. A good acid-resisting and fire-proofing for timber is formed by painting alternate layers of silicate of soda and thick lime wash.

All parts of the buildings and plant, especially the steelwork, require careful painting. If acid corrosion has started, this must be neutralised by lime, and scraped clean before painting. There are many so-called acid-resisting paints on the market, but probably none which are entirely satisfactory under all conditions. Prepared tar on the whole gives the best results. Ordinary gas works tar boiled free from water, and to which has been added sufficient lime to neutralise the tar acids, and a little tallow, and applied hot to a dry surface, will preserve timber and steelwork cheaply and as effectively as many highly-priced acid-resisting paints.

In conclusion it should be pointed out that only the fringe of the subject has been touched on, each material being considered in a general way only. Each case of corrosion prevention as it presents itself requires special treatment, and experience is necessary to help decide which is the best method to adopt.

Industrial Conditions in America

MR. ERNEST J. P. BENN, the managing director of Benn Brothers Ltd., is sailing for America in the "Aquitania" on the 23rd for the purpose of studying industrial conditions in the United States. He will devote particular attention to the problem of the readjustment of wages in view of falling prices, and the steps which are being taken to re-establish overseas trade. His tour will embrace most of the industrial cities between New York and Kansas, and Chicago and Quebec. As treasurer of the Industrial League, he will visit many of the trade organisations, both of employers and of employed, and he is also provided with special facilities for examining the industrial side of the leading Universities. One of the results of the tour will be a strengthening of those relations with technical publishers in America, which is so needful in view of the ever-increasing demand for industrial technological works among the English-speaking people. With the intensive cultivation of German trade which may be looked for in view of the financial situation of middle Europe, there is a greater need than ever for the exchange of ideas and co-operation between the English-speaking nations. Mr. Benn, as the managing director of the largest technical publishing house on this side of the Atlantic, should be able to help this movement.

Potash Supplies from the Alsace Mines

Development Plans for Great Britain

ON Thursday, March 31, a large company assembled at the Café Royal, London, at the invitation of the Alsace-Lorraine Development & Trading Co., Ltd., to meet M. Lenoble, general manager of the Société Commerciale des Potasses d'Alsace. Mr. E. Roudolphi, managing director of the Alsace-Lorraine Co., presided, and among those present in addition to M. Lenoble, were MM. Bilcock, French Deputy Consul, and Marchat, French Vice-Consul; MM. Pierre Post and E. Weiss, directors of the Alsace-Lorraine Development & Trading Co., Ltd.; M. A. Renckert (secretary), Mr. A. Stephen and Mr. Williams; Mr. Ashworth (G. W. Thornton & Co., Ltd.), Dr. Brown (West Norfolk Farmers Chemical & Manure Co.), Mr. W. Clark (Dalgety & Co., Ltd.), General O. K. Chance (British Potash Co., Ltd.), Capt. Goulding and Mr. Milne (W. & H. M. Goulding, Ltd.), Mr. Hooper (T. Vickers & Sons, Ltd.), Mr. Lillico and Mr. Turpin (W. Lillico & Son, Ltd.), Mr. Martens and Mr. Strong (The Anglo-Continental Guano Works, Ltd.), Mr. Menzies (J. & J. Cunningham, Ltd.), Mr. Prideaux (The Colombo Commercial Co., Ltd.), Mr. Shipston (Packards & James Fison & Co. (Thetford), Ltd.), and Mr. Thornley (Alex. Cross & Sons, Ltd.).

Recent Progress and Future Plans

The CHAIRMAN, in introducing M. Lenoble, said that he only accepted his present post of general manager a few months ago, but had already familiarized himself with many of the intricate problems with which the potash mines of Alsace were confronted. One problem which M. Lenoble had seized upon as being of the greatest urgency was the consolidation of the progress which Alsatian potash had made in the United Kingdom in the past two years. The ground gained could easily be extended, given a clear understanding between the potash mines and the leading firms responsible for the distribution of potash in this country. As M. Lenoble was a believer in the method of studying things on the spot, he had made the journey to England with the special object of seeing for himself how matters stood, of making the personal

MONS. E. ROUDOLPHI.

acquaintance of the men who are representing French potash, and of emphasizing the absolute necessity for retaining the British market.

Under the direction of Senateur Helmer the potash mines of Alsace were determined that nothing should be left undone to keep French potash ahead of all competitors in Great Britain. This could only be achieved with a continuance of British co-operation, of which he had had many proofs in the past two years, and this being the case M. Lenoble assured them that he would offer every facility and assistance to

MONS. E. LENOBLE.

place French potash in this country in an impregnable position Alsatian potash played in Anglo-French trade a very great part, both agriculturally and industrially. Potash could even serve as the pivot of undertakings which might give England the lead in the world's chemical trade. France was in the fortunate position of being able to supply them with all the raw material required, and as Britain had the plant to handle it to advantage she was in a position to render herself entirely independent of outside potash compounds. What that meant was shown by the lessons of the Great War. With an unlimited supply of raw potash from France every kind of potash compounds should be manufactured over here Through the new opportunities for labour thus created unemployment, which was already too great, would be lessened, and Britain would establish a new industry of national importance which in course of time could not fail to assume very large dimensions.

Steadily Increasing Imports

Speaking of the supply of French potash, the Alsace mines had been considerably developed of late and the output largely increased. The output under German control only reached in 1913 87,500 tons of pure potash (K_2O), whereas in 1919 it amounted to 90,000 tons, and in 1920 to 200,000 tons. In 1921 it would reach nearly 300,000 tons. The imports of Alsatian potash salts into the United Kingdom had also made great strides. The shipments of crude potash salts were in 1919 15,000 tons, but in 1920 they rose to 100,000 tons. If they added to these figures the chloride of potash brought in, the total quantity of K_2O imported into the United Kingdom was a very fine tribute to the capabilities of the Alsatian potash mines which had to struggle against many and heavy difficulties throughout 1919.

The increased consumption of crude potash salts seemed to be a proof that farmers were appreciating more and more the value of raw potash as one of the best fertilisers. The consumption of these low-grade salts must be stimulated by every means, for they were the cheapest means of enriching the soil.

The campaign of propaganda which the Alsace-Lorraine Development & Trading Company had been carrying on for a considerable time has no doubt contributed to the growing popularity of French sylvinite. The British farmer was patriotic and pro-Ally, although, of course, he studied his pocket; but if potash were offered to him from several sources on equally favourable terms he would always choose the goods of his friends, and it was here that the agents of the potash mines of Alsace had an exceptional chance of scoring over unfair competition.

The chairman appealed for whole-hearted support of the effort to give French potash a predominating place in the United Kingdom, for this would not only help France, but also help to make England independent of a foreign industry which did not afford the country any economic advantages. In asking for this support he included the representatives of the British Press. The cause of Anglo-French unity had ever been warmly advocated by practically the whole Press of this country, and he was voicing not only his own feelings, but those of all his countrymen, in expressing the gratitude of the French business world for the encouragement which the journalists of this country had always given to a closer rapprochement between the English and French peoples. He concluded by proposing success to the potash mines of Alsace and increased co-operation between Britain and France, and coupled with the toast the names of MM. Paul Helmer and E. Lenoble.

M. Lenoble

M. LENOBLE, in responding, said that through the Société Commerciale des Potasses d'Alsace France desired to give a friendly nation the benefit of the new sources of wealth of her soil, and thus to save her from the German monopoly. He had come over to give an assurance that the mines of Alsace were to-day in a position to supply the whole of the British market, and that the Société Commerciale would neglect nothing to retain that market. Their desire was to work with Britain in the most perfect collaboration and in an atmosphere of friendliness, so as to find the best means for developing their common activities in order to secure for the products of the mines the place that was theirs by right. The mines had confided their administration to a former staff officer, who was proud of having fought on the side of, and even in the ranks of, the British Army, who was proud of having belonged to the staffs of the armies which had beaten the German Army, routed it out of France, and reconquered Alsace-Lorraine. To-day the economical struggle followed the deadly conflict of yesterday, but the adversary was the same, and he would find in front of him the same men, ready and strong, and again determined to win the battle.

Mr. Menzies, in proposing prosperity to the companies interested in the potash mines of Alsace, said he thought they could confidently look forward to a continuance of the remarkable progress made within the last few years. The British and French were getting to understand each other more and more, and he believed there was a great future before the companies.

Captain Goulding also offered his congratulations on the progress made and the good prospects in view.

In acknowledging the toast of "The Press," Mr. F. E. Hamer said he had been associated with Mr. Rondolphi and his Alsatian colleagues during the war, and had seen something of the enthusiasm and organising ability they had shown in presenting the case for the restoration of Alsace and Lorraine before the people of this country. If they applied the same qualities to the commercial development of the recovered provinces—and they were obviously doing it—they would, no doubt, secure as striking a success.

Changes in the Ministry

A NUMBER of changes in the Government were announced last week. Sir Robert Horne, president of the Board of Trade, becomes Chancellor of the Exchequer; Sir P. Lloyd-Greame, Parliamentary Secretary to the Board of Trade, succeeds Mr. F. G. Kellaway, as Director of the Overseas Trade Department; Mr. Kellaway is promoted to the Postmaster Generalship; Sir Alfred Mond, First Commissioner of Works, succeeds Dr. Addison as Minister of Health.

Muriate or Sulphate of Potash

To the Editor of THE CHEMICAL AGE

SIR,—Your correspondents "Farmer," "Chemist" and "Kultur" are obviously unwilling to attach names to their communications in your issue of the 26th. The respective merits of muriate and sulphate of potash have been very fully entered into, and farmers would be well advised to try practical field experiments on their own particular soils, and then compare the respective results with the costs.

"Farmer" writes that I make a very sweeping statement in stating that cereals such as wheat, barley, oats and rye can be produced more profitably without potash. It is no doubt a very sweeping statement to make, but it is not an expression of opinion, but a statement of fact. Compared with root crops, cereals remove comparatively little potash from the soil, and what is taken is chiefly located in the straw which, under good farming, should be returned to the land. An average yield of 30 bushels per acre of wheat removes about 9 lb. in the grain and 18 lb. in the straw. Barley (40 bushels) removes 10 lb. in grain and 23 lb. in straw. Oats (45 bushels) remove 8 lb. in grain and 29 lb. in straw. On the other hand, potatoes, 6 tons per acre, remove 75 lb. and 1 lb. in haulm; turnips, 17 tons, remove 108 lb. and 40 lb. in the leaves; mangolds, 22 tons, remove 191 lb. and 71 lb. in the leaves.

These figures should be sufficient to convince any practical mind that potash salts are not specially required by cereals, and that money is more economically spent in the application of phosphates and nitrogenous manures for such farm crops.

Practical Field Results

If we examine the manuring experiments on oats carried out by the Department of Agriculture in Ireland, quoted by "Farmer," on page 357, and representing the average results obtained over 11 years 1901 to 1911 at 150 centres, we have the following figures:—

Average Yield per Statute Acre.

Plot 1. No manure.		Plot 2. 1 cwt. sulphate of ammonia.		Plot 3. 3 cwt. superphosphate.		Plot 4. 1 cwt. sulphate of ammonia. 3 cwt. super.		Plot 5. 1 cwt. sulphate of ammonia. 3 cwt. super. 3 cwt. kainit.	
Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.
15 1	26	18 1	31	18 1	30	21 0	36	22 2	39

It will be seen that 1 cwt. sulphate of ammonia increased the yield of grain 3 cwt. over the no-manure plot, that 3 cwt. of superphosphate gave a similar increase, that sulphate of ammonia and superphosphate combined gave an increased yield of 6 cwt., and finally when 3 cwt. of kainit was applied in addition to sulphate of ammonia and superphosphate the increased yield was 7 cwt. 2 qr. over the no-manure plot. In other words, 3 cwt. of kainit gave only half the increase that either 1 cwt. sulphate of ammonia or 3 cwt. of superphosphate produced.

It is certainly curious and unfortunate for purposes of comparison, that there was no plot on which 3 cwt. kainit was tried *alone* so that a direct comparison could have been made with the results obtained in plots 2 and 3 on which sulphate of ammonia and superphosphate were used alone. It is not fair or safe to assume that the increased yields in plot 5 over plot 4 were entirely due to the addition of kainit, and how far the increased yield was due to the combined effect of sulphate of ammonia and superphosphate acting in conjunction with each other.

Soils capable of producing cereals usually contain sufficient potash to supply naturally the small requirements in this respect, as already pointed out, and as an agricultural analyst of over 50 years' experience I can confidently affirm from the many samples of corn manures analysed that economically it is not usual to include potash; and that it is more profitable that the farmer should confine his purchase of artificial fertilisers to phosphates and ammonias or phosphates and some nitrate of soda for application to corn crops.—Yours, etc.,

JOHN HUGHES, F.I.C.
Official Agricultural Analyst for Herefordshire.

March 31.

To the Editor of THE CHEMICAL AGE

SIR,—As silence might conceivably be wrongly interpreted as acquiescence, I should like to pass a few comments on some of the views put forward by "Kultur" in his letter on the above subject. It is surely very evident that in the original article on the above subject, which was essentially comparative, any specific data with reference to sulphate could have possibly no value without corresponding or similar data referring to muriate.

My contention that the chloride is definitely toxic to certain higher plants and to soil micro-organisms is borne out by a large amount of research and practical evidence. A practical illustration of the toxic effect of the muriate of potash is found in cases of intensive cultivation, where fertilisers have to be used in large amounts in accordance with a relatively high level of crop production. In such cases chlorides have proved positively harmful, as in the Lea Valley, and dare not be used, while the sulphate of potash can be employed with perfect impunity up to the requisite extent.

The proved toxic influence of the muriate is often manifested even under ordinary conditions of farming. It has been observed frequently in the case of the manuring of late sown crops and especially on soils poor in lime, where presumably the muriate remains undecomposed to a large extent. After making due allowance for the inexactness of farmers' evidence, the opinion expressed in this country as to the effect of muriate in producing watery or waxy potatoes is far too general not to possess a considerable substratum of truth. Even from the quantitative point of view, the potato experiments by the Leeds University, Midland College, as well as the Glasgow College, have all resulted definitely in favour of the sulphate.

The suggestion by "Kultur" that the magnesia salts are not likely to benefit sandy or peaty soils, because they would detract from the lime content of the soils, is open to very adverse criticism. Magnesia is an essential plant food, like potash, and as potash salts are at least equally as if not more exhaustive of lime than magnesia salts, it would be as reasonable to argue that potash salts should be withheld from sandy and peaty soils because they help to deplete the land of lime.

There is a considerable amount of evidence to justify the opinion that a considerable proportion of soils will be found to respond profitably to magnesia as sulphate, and that potash or other fertilisers, which provide this in a secondary way, will eventually have a clear advantage over others. The conclusion drawn by "Kultur" from a comparison of the ordinary kainit and muriate of potash is not sound, as kainit in addition to magnesia would provide another variable factor in the extra amount of chloride. The only scientific comparison to estimate the effect of the magnesia would be muriate of potash and muriate of potash and sulphate of magnesia. The claim made by "Kultur" that a large amount of magnesium salts has an injurious effect on the growing crops, although I cannot find any instance of this so far as sulphate of magnesia is concerned, would, of course, equally well apply to any fertiliser, and even to the muriate of potash, as I have shown above.—Yours etc.,

April 5. CHEMIST.

The Fertilising Value of Magnesium Salts

To the Editor of THE CHEMICAL AGE

SIR,—A good deal of research work has been carried out both in England and America in ascertaining the actual functions and the influence of magnesium salts on plant growth, and recently some valuable data has been supplied by Dr. Russell of Rothamsted Experimental Station, but as the different results have so far proved conflicting, it seems advisable in the interests of the practical farmer that more extensive trials should be made under varying conditions before any definite deductions are made with regard to the fertilising value of these salts.

Investigations made by Loew in the United States and in Japan showed that in many cases magnesium salts have an injurious effect on plants, and more particularly so when there is a deficiency of lime in the soil, the harmful influence being increased in direct proportion as the lime is diminished. The amount of magnesia required by plants is very small, and unlike phosphates, potash and nitrogen, it is generally found in sufficient quantities in ordinary soils to meet the full requirements of crops, so that apart from the fact that magnesium salts have an injurious effect in the absence of lime, they are not generally required to restore fertility.

On certain soils rich in potash and lime it has been shown that magnesium salts have a certain value in rendering these constituents available to plants, but the action is not maintained indefinitely, and there is no evidence to show that the application of magnesium salts is equivalent to supplying potash manures to make up for any deficiency of potash in the soil.

With regard to the Rothamsted trials, it must be considered that they were carried out on a soil which is fairly rich in potash and lime, and the indirect fertilising value of magnesium salts in setting free a supply of these plant foods for the wheat crop was to be expected. Had these trials been made on the ordinary farming rotation, however, the results would have probably shown up differently, since the amount of potash required by roots, potatoes and other crops is far in excess of what is required by cereal crops alone.

It is to be regretted that no comparisons were made with chloride of soda as well as with sulphate of soda and magnesia in the Rothamsted trials. It is well known that sodium chloride common salts have an indirect fertilising value, as shown by a result on mangolds and cereal crops. To the ordinary farmer a comparison between common salts and magnesium salts would have been of considerable practical value.

It has sometimes been put forward that kainit may have an additional fertilising value because of the magnesium salts which it contains, but on the contrary it has been shown that on the majority of soils muriate of potash and sylvinites, which contain only a small percentage of magnesium salts, give equally good, and in many cases better, results than kainit, which contains a large proportion of these magnesium compounds, so that evidently the magnesium salts in kainit have no more fertilising value than common salt, if even so much.

Although on certain restricted areas a small amount of magnesium salts may occasionally have a beneficial effect, it can be anticipated that a large amount of magnesium salts will have an injurious influence on the growing crop.—

Yours, etc., FERTILISER.

Flotative Reagents

To the Editor of THE CHEMICAL AGE

SIR,—I have read the editorial note on "Flotative Reagents," which appears in your issue of March 5, 1921, and note your reference to the flotation of coal.

I am enclosing, for your information, a reprint of a paper by Dr. R. F. Bacon and myself, which considers, on pages 2 and 3, "Flotation as a Method of Recovering the Coal Contained in Washer-Waste." The process developed here for the recovery of coal from low-grade fuels is described in United States Patent 1,329,493, a copy of which you will doubtless be able to obtain in London.—Yours etc.,

Mellon Institute of Industrial Research, Pittsburg, Pa., March 23. W. A. HAMOR, *Assistant Director.*

Rubber Research in Ceylon

WRITING from Kalutara, a correspondent of the *Times* refers to the appointment by the Ceylon Government of a Committee to administer and control rubber research work, and states that the Director of Agriculture is chairman of the Committee. Steps will be taken immediately to secure the services of a chemist, a physiological botanist, and a mycologist. It is further proposed that a London Advisory Committee (under the direction of Professor Dunstan, of the Imperial Institute), be appointed to control and direct chemical research in vulcanisation and other problems.

In Ceylon particular attention will be given to mycological and physiological investigations, and steps will be taken to enlist the support of rubber producers in Ceylon with a view to extending research work. The laboratory formerly used by the Rubber Growers' Association will be taken over by the new Committee, who will also administer the Government grants and funds placed at the disposal of the Rubber Growers' Association.

Scientific Principles of Cold Storage

Importance of Freezing Velocity

MR. JULIAN L. BAKER, presided at a meeting of the London Section of the Society of Chemical Industry on Monday at the rooms of the Chemical Society, Burlington House, Piccadilly, when a paper on "The Scientific Principles of Cold Storage" was read by Professor W. Stiles. The following is an abstract of the paper and discussion:

From the point of view of the chemical problems involved, food substances might be divided into two classes with regard to cold storage, (*a*) those which must be stored at temperatures above the freezing point if serious deterioration is not to result, (*b*) those which can be frozen solid, and yet give on thawing an undeteriorated product. In the first group the physical properties of the substances undergo no change, as at temperatures above the freezing point the liquid part of the food substance remains liquid. But in this liquid medium chemical actions proceed, and the changes resulting are known as maturing or deterioration. The problems are chiefly those involved in the reduction of such deteriorating changes to a minimum; they are thus mainly problems of organic chemistry, and particularly biochemistry.

In the second group the physical condition of the substances is changed. There is an alteration from liquid to solid, so that any chemical changes which occur must do so at an extremely slow rate. The problems are thus mainly those of physical chemistry, namely, of so conducting the freezing, storage and thawing processes that the changes taking place on freezing are exactly reversed on thawing, so that the final state of the food material is the same as the first.

Preservation by Freezing

The first method is applicable to any substance, but only a few substances can be preserved by freezing. But the time during which material can be kept in the frozen condition may be fifty times as long as that during which it may be stored at temperatures above the freezing point. It is obviously one of the chief objects of investigation to extend the method of preservation by freezing to as many substances as possible. Past investigations suggest that the important thing in making the changes which take place on freezing reversible on thawing is the freezing velocity. In slow freezing there is a separation out of large crystals, which on thawing only partially reabsorb the substances formerly dissolved in the water of the food substance. If the freezing is rapid enough, however, the whole mass solidifies rather as a glass, and on thawing of this the original system is re-obtained.

It then becomes necessary to determine means of rapid freezing. Apart from using a lower temperature of the freezing medium, this can be brought about by a suitable choice of the medium which is used to bring about the freezing. The greater the thermal conductivity of the medium the more rapidly freezing is effected. Thus mercury is a very efficient medium, while gases at atmospheric pressure are very inefficient. Mercury, for a number of reasons, is not practically useful, and so a less efficient medium has to be used, namely, an aqueous solution of a salt, particularly sodium chloride.

Chemical Reaction

Freezing is accomplished much more rapidly in this medium than in air at the same temperature. By this means it has been found possible to extend the method of cold storage in the frozen condition to almost all species of fish, and there seems no reason why it should not be extended ultimately to the case of beef. The chief reason against this at present is that chemical reactions take place between the food material and the freezing medium in which it is immersed, whereby the surface assumes an unusually dull colour. This difficulty should be eliminated by further biochemical research. Other problems arise in the storage and thawing processes. By the application of chemical and physical principles the solution of these problems is to be indicated.

Discussion.

Dr. SCHACH SOMNER suggested that fruit, which deteriorated on account of respiration, might be kept for a longer period in cold storage if the air was pumped out and carbonic acid gas substituted.

Dr. HATSCHEK, speaking on the question of the freezing of gels, said that taking the simple example of a gelatine that took up a certain amount of its weight in water, say, 5 to 10 times, if that were frozen and then thawed, theoretically it should give up that amount of water again; as a matter of fact, such a gelatine never got back to its original condition. The process was not completely reversible, and he did not think that the rate of freezing or cooling would affect that question.

Dr. STEPHEN MIALL asked the author whether he had had occasion to study the conditions under which minute animals could live through freezing. It was well known that animals, such as worms and caterpillars, managed to survive very severe degrees of frost. Had the author studied whether they had been slowly or rapidly frozen, or what were the conditions which enabled them to survive very low degrees of frost.

Mr. COLLETT asked if the author had had any experience of the preservation of mixtures of alcohol and water or effervescent liquids containing gas in solution under pressure. There might be some very interesting problems in these considerations.

Professor STILES, replying to the discussion, said he did not quite follow Dr. Hatschek's argument as to the gel. He should have imagined that if 5 per cent. was absorbed before freezing, that same quantity would be given up on thawing.

Dr. HATSCHEK said the fact was that that was not the case.

Professor STILES, speaking with regard to the freezing of animals, said he did not believe that they were really frozen, and especially worms and similar insects. He had had no experience of freezing alcoholic liquors.

Society of Chemical Industry

Annual Meeting of Manchester Section

THE annual meeting of the Manchester Section was held on Friday, April 1, Mr. John Allan presiding. Five members of the Committee retired and as there were seven nominations to fill the five vacancies a ballot was taken. Messrs. Cheetham and Norris were appointed scrutineers, and in the result Messrs. R. H. Clayton, J. R. Hannay, W. B. Hart, J. A. R. Henderson and J. Huebner were elected. The former auditors of the Section, Messrs. H. C. Clanahan and G. H. Steven, were re-elected.

The hon. secretary (Mr. L. G. Radcliffe) read his report of the transactions of the Section for the year 1920-21, extended reports of which have already appeared in the columns of THE CHEMICAL AGE. It was also announced that Dr. E. Ardern would act as Chairman of the Section for the next two years.

Sulphuric Acid During the War Period

The ordinary monthly general meeting of the Section followed, and a paper on "Sulphuric Acid during the War Period" was read by Mr. H. J. Bailey, F.I.C.

The paper consisted of a report largely of figures collected during service with the Explosives Department of the Ministry of Munitions, and the production and uses of sulphuric acid during the war period, 1915-1918. It was shown that whereas the normal production of sulphuric acid in the United Kingdom was somewhere about one million tons per annum of 100 per cent. strength, during 1916 it attained the figure of 1,208,000 tons produced from chamber acid plant, and, in addition, concentrated or fuming sulphuric acid made on contact acid plants reached the figure of 221,000 tons during 1917.

The chief problem in 1915 and 1916 was to provide quickly a sufficiently strong sulphuric acid for the manufacture of explosives, and for this purpose a great increase had to be made in the production of concentrated acid at the various manufacturers' works, which reached during 1916 the figure of 371,000 tons as against a normal production of something like 75,000 tons, and also to erect further contact acid plant, which was largely done at the National Explosives Factory.

The raw materials for the manufacture of sulphuric acid were dealt with, and tables were given showing the various main uses in the heavy chemical industries of the country. In addition, summarised statistics were given of the consumption of sulphuric acid in the manufacture of the various types of explosives, and it was shown that in the period 1916 to 1918 the overall consumption was reduced to less than one-half that used during the year 1915 per lb. of explosive

manufactured by effecting increased efficiencies and necessary economies in working.

Mr. Bailey also dealt with the production and use of artificial fertilisers during the years 1917 and 1918, when the submarine menace enforced attention to the question of food production in this country, and showed that, while the manufacture of artificial fertilisers seriously decreased during the first two years of the war, before the war ended the full pre-war production had been attained and even surpassed, and that a very large increase had occurred in the use of home manufactured sulphate of ammonia for agricultural purposes.

Messrs. Allan, Thomson, Norris and Ardern took part in the subsequent discussion.

Liverpool Section

THE annual meeting of the Liverpool Section of the Society of Chemical Industry will be held at the Adelphi Hotel, Liverpool, on April 29, at 6.15 p.m. Nominations for the 1921-22 Committee are as follows: Chairman, Dr. G. C. Clayton; vice-chairman, Dr. E. F. Armstrong; hon. secretary, E. Gabriel Jones; hon. treasurer, A. Holt; committee, C. O. Bannister, F. E. Everington, C. W. Moore, W. Ramsay, W. H. Roberts, W. Trantom, W. Clayton, G. W. Beaumont, A. E. Findley, Edwin Thompson and E. L. Peck; representative on chemical Engineering Group, Edwin Thompson.

After the formal business of the meeting is concluded, Sir William J. Pope will deliver a paper on "Mustard Gas."

Newcastle-on-Tyne Section

A dinner in honour of Sir William J. POPE has been arranged to take place at the Central Station Hotel, Newcastle, on April 22, at 7 p.m.

In addition to Sir William Pope, the Lord Mayor, the General Secretary, Dr. J. P. Longstaff, and representatives of kindred Societies are expected to be present.

The Case for Fine Chemicals

MR. G. E. PEARSON, general manager of Burroughes, Wellcome & Co., in a statement on the financial resolutions issued last week said the Customs duty of 33⅓ per cent. was less than the trade had hoped for. Their expectation had been that it would be at least 50 per cent., and whether the duty proposed would prove high enough to meet the needs of the case, only experience could show.

Mr. Pearson claimed that the adverse conditions which he foresaw in 1918 had since become realities, and the competition from Germany and other countries was now such that unless the fine chemical industry obtained some assistance at once we should sink back into the condition we were in before the war, that is, our trade in those chemicals would be carried on by brokers, and not only would a great many people be thrown out of employment, but, in the event of another war, we should again be dependent for our supplies of vital chemicals on foreign, and possibly hostile, nations. All the industry asked for was assistance for a reasonable period to enable manufacturers to perfect their plant and processes and to gain experience in making synthetic organic chemicals on a large scale. They also wished to be protected from the unfair competition from abroad due to the collapsed exchanges. By the end of five years it was hoped that the exchanges would be stabilised, and our fine chemical industry would then be strong enough to fight its foreign competitors on equal terms. As an example of the effect of the German exchange at the present moment, Mr. Pearson said that the German workman in the fine chemical trade was paid 75 marks per week, which, if the exchange were at par, would place the two countries almost on an equal footing as regards wages costs. But at the present depreciated rate of exchange the German wages were equivalent to only 6s. 3d. per week, which made it quite impossible for the British manufacturer to compete.

The new High Sheriff of Staffordshire is Mr. G. LE MESURIER MANDER, of Wightwick Manor, Wolverhampton, a partner in the firm of Mander Brothers, ink, paint and colour manufacturers, of Wolverhampton. He is the eldest son of the late Mr. S. Theodore Mander, is a Justice of Peace for Staffordshire, and a former Member of the County Council.

Industrial Chemists

Review of Association's Work in 1920

AT the fourth annual meeting of the National Association of Industrial Chemists held at Sheffield recently, and presided over by Mr. A. B. Searle, among other important business transacted was the reading of the general secretary's report on the activities and progress of the Association during 1920, from which we note that, although many difficulties were met with during the latter half of the year, chiefly as a result of the coal strike, and the decline in trade, the N.A.I.C. came successfully through a period which proved to be the most critical since its formation. At present there are nearly 1,100 members on the register, and a slight gain in membership has been made.

The publication of a magazine by the Association was carefully considered by a committee, but was deferred on account of cost. The matter is not being lost sight of, however, as it is felt that such a publication would be of considerable value as a medium for keeping in touch with the members (especially those not attached to a section), and also in making the Association's aims and objects more widely known.

The President, the report continues, devoted much time in attending meetings of the various sections, and in interviewing many of the individual members. He also gave lectures before the Sheffield section, and his advice and assistance proved invaluable on numerous occasions. Full advantage was taken of the "advice bureau" and quite a number of members were helped with a variety of problems.

With regard to income tax rebates, it is interesting to note that the Association has received a statement from the Commissioners of Income Tax to the effect that, although rebates for damaged clothing, travelling expenses, scientific books, subscriptions, &c., cannot be granted indiscriminately to industrial chemists, members of the N.A.I.C. may put in a claim for such expenses if they are necessarily incurred in the course of their employment.

Economic Status of Members

The economic status of the members was always uppermost in the minds of the Association's officials, and a special committee was formed early in the year to consider and draw up a scale of minimum salaries. This very difficult and complex subject was tackled whole-heartedly by the committee, and eventually a scale was submitted to and approved by the National Council. A copy of the scale was then forwarded to all members with a request that any member receiving less than the minimum mentioned therein should communicate with the Secretary, who should then endeavour to secure an increase in salary. Although the coal strike and the slump in trade has interfered temporarily with this scheme, the results obtained were satisfactory, and well over one hundred members have received increases in salary. Even though these endeavours to obtain better pay were upset by unforeseen circumstances, the experience gained goes to show that the Association has very good prospects of doing much better in this direction when trade is more normal.

Another committee was also formed to discuss preliminaries with the British Association of Chemists in order to try and bring about an amalgamation. Several meetings have been held and negotiations are still proceeding.

There are now nine members registered as being out of work, and fifteen other members requiring a change of situation. Several members have secured situations with the Association's assistance, and two members have received considerable increases in salary.

Stating that there is a tremendous amount of work to be done in the interests of the industrial chemist, the report points out the necessity for obtaining a strong organisation, both numerically and financially, and one that is fully representative of the industrial chemists of Great Britain.

The Secretary also explained that it is imperative that every works chemist, both in his own interests and those of his fellow chemists, should belong to a trade union, and that it is his duty to make that union a strong one. Reference is then made to the work of the Local Sections which is both educational and social in character, and also to the invaluable support and assistance which has been rendered by the officers and councillors of those Sections.

Chemical Factor's Affairs

Meeting of Creditors

A MEETING of the creditors of Massey & Winbury, Ltd., 17, Queen Victoria Street, London, E.C., was held on April 1 at Portland House, 73, Basinghall Street, the offices of the liquidator, Mr. E. D. Basden.

The company was formed to take over a business of chemical factors and agents which was started in 1919 by Messrs. Massey & Winbury. The business had made good progress from the start and the company was formed by those gentlemen for the purpose of obtaining increased capital and through its formation a further £1,400 was secured as capital for the business. In the chairman's opinion, having regard to the amount of capital, the company over-traded, carrying large stocks for future delivery, and when the slump came there could be only one result.

Dealing with the statement of affairs the chairman said the unsecured creditors were £13,881, the partly secured creditors £5,247, the estimated value of the security held by them being £3,763, leaving an unsecured balance of £1,484, and there were preferential creditors for rent £60. The total ranking liabilities therefore were £15,365. On the assets side of the account there were trade fixtures, fittings, &c., which cost £148, which he estimated would produce £90, good book debts £101, and doubtful £1,553, which he estimated to produce £600, whilst "differences on contracts" represented £1,175. The total assets therefore were £1,966, which after deducting the preferential claims £60, left net assets £1,905, and a deficiency of £13,459.

The chairman explained that the unsecured creditors were those who either appeared from the books to be creditors or persons of whom he had information who were likely to be creditors. The claims of creditors who had actually proved did not amount to more than £300 or £400, but he understood the reason of that was that the remainder were looking to the old firm and not to the company for payment, and should their claims be upheld the partners of the old firm would be entitled to be indemnified by the company. So it would appear that the liability under the head of unsecured creditors was not overstated.

A representative of Messrs. Victor Blagden & Co., who claimed £9,294 from the partners, said that while he had no objection to the voluntary liquidation continuing with an informal committee it must be understood that he did not agree to the solicitor of the company acting as the solicitor to the liquidator.

A resolution was passed confirming the liquidator in his appointment, and an informal committee, comprising representatives of Messrs. Mangold Brothers, Walter Waugh & Co. and Eden Fisher & Co., Ltd., was elected to assist him, Mr. Basden agreeing to be guided by the advice of that committee.

Safety in the Foundry

AT a meeting of the Lancashire branch of the Institution of British Foundrymen, held on April 2nd, Mr. A. R. BARTLETT read a paper upon "Safety in the Equipment of Foundries." He mentioned that the foundry trade had a larger percentage of accidents than any other branch of the engineering industry. The number could be greatly reduced by the adoption of suitable precautions, provided also that all concerned co-operated, because in many cases they were the result of carelessness.

He emphasised the importance of ventilation and lighting. The foundry had the most dusty and impure atmosphere of all manufacturing premises, and the greatest number of deaths among moulders were due to chest complaints. The use of respirators lessened some of the risks, but in the majority of cases the proper ventilation of the shop was the only safeguard.

Finsbury College Old Students' Association

THE Annual Smoking Concert will he held at Anderton's Hotel, Fleet Street, on April 22, at 8 p.m., when Professor G. T. MORGAN, F.R.S., will take the chair. Old Students may obtain tickets, 2s. 6d. each, personally from Dr. M. O. Forster, Mr. H. F. Knight, or by post on application to the Hon. Secretary, Mr. H. P. GUY, 209, Northumberland Park, N.17.

Price of Soda Ash

Summons Dismissed on Payment of Costs

BEFORE Sir Charles Johnston at the Mansion House on Monday, Albert Edward Mallandain, manufacturer, of King's House, King Street, Cheapside, was summoned for having sold on April 30 of last year, to Sampson & White, Ltd., of Holborn, 3 tons 8 cwt. of soda ash at a price which was such as to yield a profit, which in view of all the circumstances, was unreasonable. Sir Richard Muir appeared for the defence.

Mr. H. D. Roome, for the Director of Public Prosecutions, said that this summons was at the instance of the Board of Trade, and referred to the sale of soda ash. There had been much profiteering in this article in the spring of last year. So far as the defendant in this case was concerned, the original purchase was made 2½ years prior to the sale. It was purchased from Brunner, Mond & Co., at £6 13s. per ton, and resold at the date in question at £27 per ton, realising a profit of 306 per cent. on cost price. The circumstances came to the notice of the Board of Trade in October of last year and correspondence passed, when defendant explained that he purchased the ash for his own purposes, but owing to the war he had been unable to use it, and on being offered £27 per ton by Sampson & White, he agreed to sell it as it was lying idle at his works. Although it might be said to be an isolated transaction, it was regarded as serious in view of the fact that soda was an essential material in daily use in every household.

Sir Richard Muir contended that there was no evidence to prove that this article came within the scope of the Order of the Board of Trade; Mr. Mallandain had large interests in other matters beside his works at Park Royal and this was a solitary sale during the illness of his manager. The stuff was lying there idle and Sampson & White made their own offer. There was no bargaining, and subsequently there was an allowance made on account of the condition of the ash.

At this stage counsel held a consultation, as the result of which Mr. Roome said that Sir Richard agreed to plead guilty to a technical offence on condition that no conviction was recorded.

The Bench agreed to this course and the summons was dismissed under the Probation of Offenders Act on payment of £10 10s. costs.

Scientific Glass Industry

Many Works to Close Down

IN an interview with a representative of THE CHEMICAL AGE, Mr. T. Lester Swain, secretary of the British Chemical Ware Manufacturers' Association, Ltd., said that a number of firms manufacturing scientific glassware had decided to close down in consequence of German competition and that all employees in the industry had received a week's notice, at the expiration of which they will only work from day to day. These drastic measures, he said, have been rendered necessary by the total inadequacy of the terms of the first of the Ways and Means Resolutions for the Safeguarding of Industries Bill. In the opinion of the members of the British Chemical Ware Manufacturers' Association, representing the whole of the scientific glassware industry in this country, a tariff, whether high or low, would not provide a solution of the present position, as Germany was prepared to subsidise the industry in her own country in order to recapture the British industry.

Questioned as to the means whereby the industry might be saved, Mr. Swain said it was the considered opinion of the members of his Association that the only form of assistance which would prove successful was the total prohibition of imports of scientific glassware, with licensing clauses. While realising the inconveniences of Government control they were convinced that it was only by this method that the industry could be kept in this country. They were also perfectly willing to agree to any scheme for the limitation of profits or prices for the protection of consumers.

The works of the COLONIAL AMMUNITION CO., Melbourne, Australia, have been taken over by the Defence Department for a term of years. It is stated that the authorities desire fuller control over the output of the works, although every effort will be made to meet public demand for the products.

From Week to Week

IMPORTS of chemical products, drugs, &c., into Santos in 1920 were valued at $15,767,524.

Mr. E. K. MUSPRATT has resigned his seat on the board of the British Insulated and Helsby Cables, Ltd., owing to ill health.

Mr. E. DICKINSON, of the Royal College of Science, has been awarded second-class honours in chemistry in the London B.Sc. examination.

The death is announced in his 45th year of Mr. S. H. BLICHFELDT, a director of the Maypole Margarine Co., and a chemist of considerable ability.

Mr. T. FUJISAWA, JUN., of the firm of T. Fujisawa & Co. manufacturing chemists, Japan and New York, is paying a visit to England and the Continent.

SULPHATE OF COPPER to the extent of 75 per cent. of the total production during March and April has been released for export by the German Metal Federation.

The net decrease in our imports from Germany during February, under the heading of dyes and dyestuffs was £527,409. Intermediate coal tar products showed a decrease of £15,538.

Claimed to be a great improvement on ether A NEW ANÆSTHETIC, known as ethanesal, has been discovered by Dr. R. L. Mackenzie Wallis, the research chemist at St. Bartholomew Hospital.

During the period April to September, 1913, India imported 6,506,000 lb. of ALIZARINE AND ANILINE DYES from Germany. The figures for the same period in 1920, 1,747,000 lb., a decrease of 4,759,000 lb.

The Electrochemische Werke at Berlin-Bitterfeld-Rheinfelden, which were partly owned by the Electro Bank at Zurich, and the Berliner Elektrizitätswerke A.-G., have been acquired by the GERMAN ANILINE TRUST.

A Moscow report states that the Chemical Workers' Union will only allow WORKMEN TO OCCUPY ADMINISTRATIVE POSITIONS. The former managers and owners of chemical works may be employed as technical advisers.

MR. H. G. A. HARDING, chemist and a director of the Natalite Motor Spirit Co., of Australia, has been in London making arrangements in connexion with new process for the MANUFACTURE OF NATALITE IN AUSTRALIA.

The directors of the Magadi Soda Co., Ltd., announce that regular shipments of SODA ASH FROM KENYA COLONY have commenced. A full cargo has recently been shipped from Kilindini, as a delivery against contracts already made.

Among the speakers to the toasts at the LUNCHEON TO SIR JOHN BENN, at the Connaught Rooms on Thursday were: The Marquess of Lincolnshire, the Marquess of Crewe, Viscount Burnham, Lord Riddell and Dr. Clifford.

As a mark of appreciation of his services to the country as the first Minister of Munitions, LORD INVERFORTH was on April 2, presented with a life-size portrait of himself, painted by Mr. R. G. Eves. Sir James Currie made the presentation.

It has been decided that the memorial to the late Lord Rayleigh, which is being promoted by a committee of Fellows of the Royal Society and members of the University of Cambridge, shall take the form of a plaque containing a medallion in Westminster Abbey.

In connexion with the London Branch of the National Union of Scientific Workers a meeting will be held on April 14, at 52, St. Martin's Lane, W.C. 2, when Mr. H. E. POTTS will give an address on "The Position of Employer and Scientific Worker in Relation to Patent Law."

Mr. E. B. Ellice-Clark, chairman of the British Oxygen Co., Ltd., states that there is every indication that the existing APPLICATIONS OF OXYGEN, and that its use in a number of industrial processes, other than those already developed, is only a question of time and further research.

Tenders are invited (by April 28) by the Controller, Plant and Machinery Section, Block "G," Earl's Court Exhibition, S.W. 5, for the PURCHASE OF MISCELLANEOUS PLANT at H.M. Factory, Lytham, among which are included four picric acid sieving machines, four cylinders for sieving machines, and three picric acid rolling mills.

IN CONNEXION with the 42nd Canadian National Exhibition, to be held at Toronto in August and September, H.M. Trade Commissioner at Toronto, 257-260, Confederation Life Buildings, East Queen Street, Toronto, has expressed a desire to receive for distribution trade literature, catalogues, &c., of manufacturers of chemical plant and scientific instruments.

At a fire at the National Shell-filling Factory, Hereford, last week, supposed to have been caused by incendiaries, 10,000 ammunition boxes out of a stack numbering a million were destroyed, but the boxes are stated to have been of the value of firewood only. The same day 250 employees were discharged from the factory owing to the transference of the work of breaking down shell to Woolwich.

Among the trading enterprises of the Queensland Government is an ARSENIC MINE, from which about 3,000 tons of ore have so far been obtained at a gross expenditure of some £17,000. The ore is passed on to arsenic treatment works, also owned by the State, whose aim is to afford relief from the very high prices ruling for arsenical products. The arsenic is supplied to farmers at £10 a ton for the destruction of prickly pear, and at £23 a ton for cattle dips and other farm requirements.

The DEUTSCHE BERGWERKS ZEITUNG states that the Potash Syndicate intends meeting America half way in regard to the SALE OF POTASH. The unsold stocks of chloride of potash in America amount to 20,000 tons and a further 29,000 tons are in German harbours, awaiting despatch. In order to put an end to the dispute concerning the "Baisse clause" the German Potash Syndicate intends to deliver 40 per cent. of the amount of potash already delivered at a rate considerably below that agreed upon for the old contracts.

According to figures compiled from periodical official announcements, the total EXPORTS OF NITRATE FROM CHILE in 1920 amounted to 60,679,834 Spanish quintals (1 Spanish quintal equals 101·4 pounds). The number of Spanish quintals shipped per month were as follows: January, 9,039,452; February, 6,081,230; March, 5,417,956; April, 5,057,414; May, 5,237,182; June, 2,411,158; July, 3,104,021; August, 4,274,873; September, 5,479,125; October 4,626,940; November, 3,581,938; and December, 6,368,545.

A GENERAL MEETING of the members of the Royal Institution was held on Monday afternoon, Sir James Reid, Bart., vice-president, in the chair. Mr. S. D. Eles, Mr. S. T. Covington, Mrs. L. W. Dent, Mr. B. G. Donne, Professor Godfrey, Commander A. C. Goolden, Mr. A. McEllieu, Mr. W. Marshall, Mr. E. W. T. L. Brewer Williams and Sir John Wormald were elected members. The chairman reported the death of Lord Moulton, a member of the institution, and a resolution of condolence with the relatives was passed.

The autumn meeting of the INSTITUTE OF METALS will be held in Birmingham on September 21-23. Persons desirous of attending as members should obtain application forms from Mr. G. Shaw Scott, M.Sc., 36, Victoria Street, S.W. 1, before April 20. The forthcoming annual May lecture of the Institute will be given on May 4, at 8 p.m., at the Institution of Mechanical Engineers, Storey's Gate, Westminster, by Professor T. Turner, M.Sc., A.R.S.M., the subject being "The Casting of Metals."

Tests made at the Victorian geological survey laboratory gave the following results from the DISTILLATION OF BROWN COAL from Morwell, Victoria: Per ton of dried coal—water of decomposition, 27 gallons; crude oil, 27·5 gallons; gas and loss, 6,000 cubic feet; carbonaceous residue, 11 cwt. The crude oil on distillation gave: benzine 1·3 lb., heavy benzine 1·3 lb., gas oil 15·0 lb., fuel oil 82·7 lb., cresol and phenol 31·2lb., engine kerosene 16·8 lb., lubricating oil 27·0 lb., wax 14·2 lb., and coke 40·5 lb.

At a recent meeting of the Gas Committee of the Glasgow Corporation it was reported that several meetings had been held by the special sub-committee appointed to consider and report as to the necessity of installing PLANT at the Corporation Chemical Works for producing an absolutely dry and neutral sulphate of ammonia. An inspection had been made of samples of dry neutral sulphate received from the South Metropolitan Gas Company and the Gas Light and Coke Company, and it was decided that before coming to any definite decisions the special sub-committee should also inspect the sulphate plant at the Bedlay Collieries near Coatbridge.

References to Current Literature

British

PLATINUM. The influence of mercury, sulphur, arsenic, and zinc on the catalytic activity of platinum. E. B. Maxted. *Chem. Soc. Trans.*, March, 1921, pp. 225-233.

REDUCTION. Reduction by metals in acid solution (I.). The reduction of acid ferric sulphate solutions by zinc and magnesium. S. Sugden. *Chem. Soc. Trans.*, March, 1921, pp. 233-238.

COMBUSTION. Phenomena of the ignition of gaseous mixtures by induction coil sparks. J. D. Morgan and R. V. Wheeler. *Chem. Soc. Trans.*, March, 1921, pp. 239-251.

REACTIONS. The action of the Grignard reagent on certain nitric esters. H. Hepworth. *Chem. Soc. Trans.*, March, 1921, pp. 251-260.

The action of ammonia on acetone. T. S. Patterson and A. McMillan. *Chem. Soc. Trans.*, March, 1921, pp. 269-271.

The action of hydrazines on cellulose acetates. W. L. Barnett. *J. S. C. I.*, March 31, 1921, pp. 61-63T.

CHEMICAL CONSTANTS. Melting points of mixtures of *o*- and *p*-toluene-sulphonyl chlorides. L. Harding. *Chem. Soc. Trans.*, March, 1921, pp. 260-262.

The solubility of ethyl ether in solutions of sodium chloride. P. C. L. Thorne. *Chem. Soc. Trans.*, March, 1921, pp. 262-268.

GALLOTANNIN. Gallotannin (XII.). M. Nierenstein, C. W. Spiers, and A. Geake. *Chem. Soc. Trans.*, March, 1921, pp. 275-286.

METHANE. Experiments on the synthesis of the polyacetic acids of methane. The conditions controlling synthesis by the cyanacetic ester method, and the preparation of methenetriacetic acid. C. K. Inkgold. *Chem. Soc. Trans.*, March, 1921, pp. 341-354.

NITROFORM. The halogen derivatives of nitroform. A. K. Macbeth and D. D. Pratt. *Chem. Soc. Trans.*, March, 1921, pp. 354-358.

AMMONIA. The Haber process at Oppau. J. R. Partington. *J. S. C. I.*, March 31, 1921, pp. 99-100R.

SULPHURIC ACID. The manufacture of sulphuric acid in the United States. *J. S. C. I.*, March 31, 1921, p. 101R.

PHOSPHATES. The phosphates of Nauru and Ocean Islands. T. Steel. *J. S. C. I.*, March 31, 1921, pp. 59-60T.

ANALYSIS. The effect of apparatus errors in the accuracy of volumetric analyses. V. Stott. *J. S. C. I.*, March 31, 1921, pp. 63-65T.

FILTER PAPER. The manufacture of hand-made filter paper. J. B. Green. *J. S. C. I.*, March 31, 1921, pp. 100-101R.

British Dominions

RARE EARTHS. The precipitation of some of the rare earths by creams of insoluble oxides and carbonates, based on the principle of hydrolysis. A. C. Neish and J. W. Burns. *Canad. Chem. and Met.*. March, 1921, pp. 69-76.

METALLURGY. The reclamation of metals from foundry waste. J. P. Norrie. *Canad. Chem. and Met.*, March, 1921, pp. 77-79.

ALCOHOL. Industrial alcohol status in Canada. *Canad. Chem. and Met.*, March, 1921, pp. 79-81.

United States

PETROLEUM. America's petroleum problem. J. O. Lewis. *J. Franklin Inst.*, March, 1921, pp. 357-379.

COLLOIDS. The zone of maximum colloidality; its relation to viscosity in hydrophile colloids, especially karaya and gelatine. J. Alexander. *J. Amer. Chem. Soc.*, March, 1921, pp. 434-440.

Silicic acid. V. Lenher. *J. Amer. Chem. Soc.*, March, 1921, pp. 391-396.

Photometric methods and apparatus for study of colloids. S. E. Sheppard and F. A. Elliott. *J. Amer. Chem. Soc.*, March, 1921, pp. 531-539.

The elastic properties of gelatine jellies. S. E. Sheppard and S. S. Sweet. *J. Amer. Chem. Soc.*, March, 1921, pp. 539-547.

RARE METALS. The isotopism of mesothorium and radium and the separation of these elements from barium. R. K. Strong. *J. Amer. Chem. Soc.*, March, 1921, pp. 440-452.

ARSENICAL COMPOUNDS. The separation and detection of arsenate and arsenite. G. W. Sears. *J. Amer. Chem. Soc.*, March, 1921, pp. 466-470.

A study of arsenical compounds related to arsphenamine. G. W. Raiziss and J. L. Gavron. *J. Amer. Chem. Soc.*, March, 1921, pp. 582-585.

Examination of neoarsphenamine. A. D. Macallum. *J. Amer. Chem. Soc.*, March, 1921, pp. 643-645.

MERCURY COMPOUNDS. Mercuri-organic derivatives (II.). Nitrobenzene mercury compounds; an indirect method of mercurizing organic compounds. M. S. Kharasch and L. Chalkley. *J. Amer. Chem. Soc.*, March, 1921, pp. 607-612.

Reaction of alkali halides with mercury derivatives of phenol. F. C. Whitmore and E. B. Middleton. *J. Amer. Chem. Soc.*, March, 1921, pp. 619-624.

METALLURGY. Electric smelting of pig iron at Domnarfvet, Sweden. G. de Geer. *Chem. and Met. Eng.*, March 9, 1921, pp. 429-433.

Cobalt brasses. L. Guillet. *Chem. and Met. Eng.*, March 9, 1921, pp. 439-443.

COBALT. A new method for the detection and estimation of cobalt. S. A. Braley and F. B. Hobart. *J. Amer. Chem. Soc.*, March, 1921, pp. 482-484.

NICKEL. A comparison of the atomic weights of terrestrial and meteoric nickel (I.). The reduction of nickelous oxide. G. P. Baxter and L. W. Parsons. *J. Amer. Chem. Soc.*, March, 1921, pp. 507-518.

NITRIDES. The dissociation pressures of iron nitrides. A. A. Noyes and L. B. Smith. *J. Amer. Chem. Soc.*, March, 1921, pp. 475-481.

REACTIONS. A theory of chemical reactivity; calculation of rates of reaction and equilibrium constants. S. Dushman. *J. Amer. Chem. Soc.*, March, 1921, pp. 397-433.

The reaction between copper and nitrogen peroxide. H. V. Tartar and W. L. Semon. *J. Amer. Chem. Soc.*, March 1921, pp. 494-500.

The reaction between acid halides and aldehydes (III.). L. H. Ulich and R. Adams. *J. Amer. Chem. Soc.*, March, 1921, pp. 660-667.

PHOSPHORUS. Vapour pressures of white phosphorus from 44° to 150°C. D. McRae and C. S. Van Voorhis. *J. Amer. Chem. Soc.*, March, 1921. pp. 547-553.

French

ANALYSIS. Volumetric estimation of arsenious compounds by means of potassium bichromate. R. Meurice. *Ann. Chim. Analyt.*, March 15, 1921, pp. 85-86.

Estimation of small quantities of iron in organic liquids and especially in wines. M. Malvezin and C. Rivalland. *Ann. Chim. Analyt.*, March 15, 1921, pp. 90-92.

A new method for the separation of iron, chromium and aluminium hydroxides. M. Lemarchands. *Ann. Chim. Analyt.*, March 15, 1921, pp. 86-87.

Estimation of maltose or lactose in the presence of other reducing sugars. M. Legrand. *Compt. rend.*, March 7, 1921, 602-604.

German

PYRIDINE. Compounds of pyridine with alkali metals (IV.). B. Emmert and R. Buchert. *Ber.*, February 12, 1921, pp. 204-209.

GLYCERIDES. Determination of the constitution of glycerides. A. Grün and F. Wittka. *Ber.*, February 12, 1921, pp. 273-289.

FATS. Esterification and its relation to the constitution of fats. A. Grün. *Ber.*, February 12, 1921, pp. 290-299.

NITRIC ACID. The reduction products of aryl derivatives of nitric acid. K. H. Meyer and W. Reppe. *Ber.*, February 12, 1921, pp. 327-337.

The action of nitric acid on phenols and phenol-ethers. K. H. Meyer and W. E. Elbers. *Ber.*, February 12, 1921, pp. 337-346.

HYDROCARBONS. The constitution of fluoranthene. F. Mayer and K. Freitag. *Ber.*, February 12, 1921, pp. 347-357.

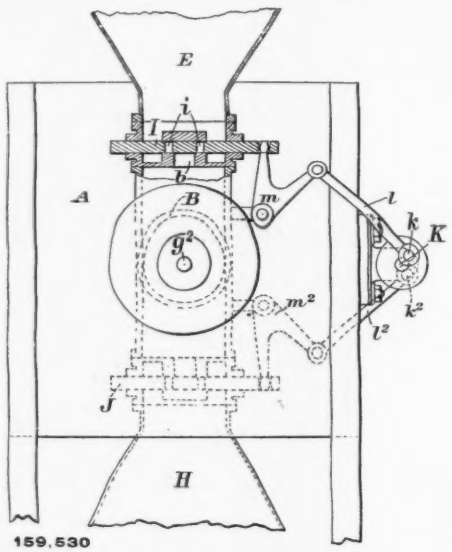
PLATINUM. Preparation of platinum black. R. Feulgen. *Ber.*, February 12, 1921, pp. 360-361.

Patent Literature

Abstracts of Complete Specifications

159,530. FURNACES FOR SUBJECTING ORES OR OTHER MATERIALS TO THE ACTION OF GASES AND THE LIKE. The British Oxygen Co., Ltd., Elverton Street, Westminster, London; S. W. Bray, 11a, Melbourne Road, Ilford, and I. H. Balfour, "Ellesmere," Buckhurst Hill, Essex. Application date, October 9, 1919.

The furnace is more particularly for subjecting ores or other materials to the action of gases, *e.g.*, reducing metallic oxides to the metals by means of hydrogen, without loss of gas and without communication with air at the charging or discharging end of the retort. A casing *A* is lined with refractory material and encloses the retort *B*, which is inclined at an angle which depends on the time during which the material is to be subjected to the action of the gas. The retort is heated externally by gas burners projecting through the sides of the casing and discharging the hot gases around the retort. The material to be treated is supplied by the hopper *E* through the passage *b* to the upper end of the retort and is distributed in the retort



159,530

by means of scoops carried by the rotating shaft g^2. The treated material is discharged into the hopper *H*, and the gas is passed through the retort in the opposite direction. The material is admitted to the retort through a valve constituted by a horizontally sliding plate *I*, having passages *i* which communicates alternately with the hopper and with the passage *b* so that the supply of material is uniform. A similar outlet valve *J* is also provided. The two valves are interconnected by means of cranked levers *m*, m^2, and links, *l*, l^2, which are connected to crank pins *k*, k^2, carried by discs which are secured to the two ends of a rotating shaft *K*. The material is thus admitted and discharged without communication with the atmosphere.

159,532. IRON, TITANIUM AND VANADIUM, TREATMENT OF MINERALS OR PRODUCTS CONTAINING. B. F. Kjellberg, Kungsgatan 68, Stockholm, Sweden. Application date, October 20, 1919.

The object is to recover compounds of iron titanium and vanadium separately from ores containing them. The material is finely ground, treated with hot sulphuric acid, and the solution of sulphates is evaporated to dryness. The residue is heated to an extent insufficient to dissociate the sulphates, and the product is dissolved in hot water. The solution is then heated, when the titanium compounds are precipitated and may be filtered off. The solution is evaporated to dryness and the residue roasted to convert the iron into oxides. The product is treated with hot water containing an acid or alkali which dissolves the vanadium compounds leaving the iron oxides. Any iron also dissolved with the vanadium compound may be removed by repetition of this process. If the starting material contains much iron, but little titanium it may be treated with very dilute sulphuric acid so that the titanium is dissolved as little as possible. The residue may then be treated with more concentrated acid.

159,602. RUBBER, COAGULATION OF. S. C. Davidson, Sirocco Engineering Works, Belfast. Application dates, December 1, 1919, and January 19, 1920.

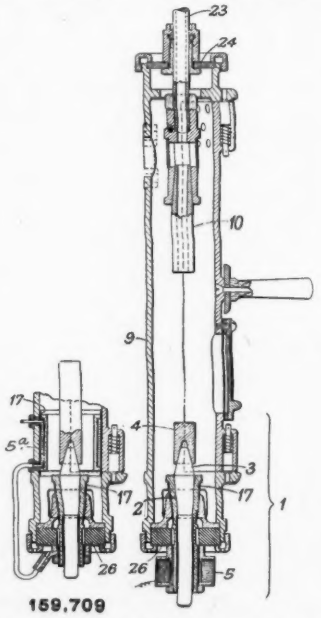
The rubber latex is first treated with a dilute aqueous solution of alkalised phenol to preserve it, and dilute acid is then added to neutralise the alkali and coagulate the rubber. Most of the impurities remain in the solution and the rubber is subjected to mechanical treatment to dehydrate it. Alternatively the coagulation of the latex may be effected by adding an acidified aqueous solution of a soluble magnesium salt, preferably the sulphate or chloride. The rubber may be rolled into sheet or crepe which may be kneaded into bars or blocks. The preservative treatment enables the latex to be kept for any required length of time prior to coagulation, and the usual smoking or evaporative drying process is unnecessary. A high quality of raw rubber is obtained.

159,659. TIN, PURIFICATION OF—OR PRODUCTION OF TIN SALTS FROM CRUDE TIN. J. J. Collins, Field House, Winsford, Cheshire. Application date, Dec. 10, 1919.

The object is to remove impurities such as bismuth, lead, copper, antimony, arsenic or iron from tin. The finely-divided crude tin is placed in a solution of stannous or stannic chloride, through which chlorine is passed. A continuous solution of the tin in the stannic chloride takes place and the resulting stannous chloride is continuously reconverted into stannic chloride by the chlorine. Metallic tin is always kept in excess so as to cause the precipitation of oxychlorides of arsenic or antimony, and metallic bismuth. Lead chloride is precipitated when the solution is cooled. Water is added to prevent crystallisation of the solution. The final product is stannous chloride, which may be treated for the recovery of tin.

159,709. NITROGEN, ELECTRODES FOR OXIDISING. F. H. Loring, 30, Norfolk Street, Strand, London, W.C.2. Application date, December 31, 1919.

The object is to increase the oxidising efficiency of the flame arc as used for oxidising nitrogen. The lower electrode unit 1



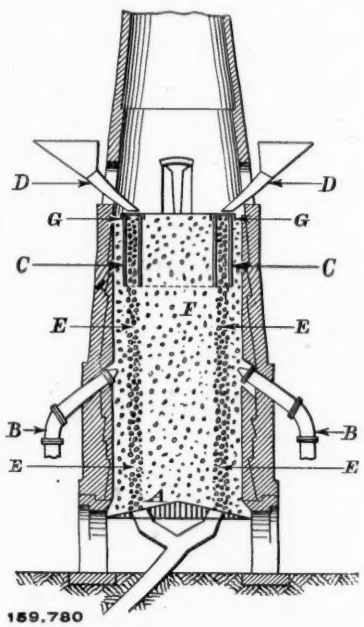
159,709

comprises a taper socket 2 holding removable electrodes 3 and 4, the electrode 3 being constructed of iron. The upper electrode

10 is hollow, so that air may be admitted through the tube 23 to the arc, and this electrode is provided with the usual reciprocating mechanism. The electrodes are intermittently brought into contact so as to close a continuous current circuit with a large inductance coil, without a secondary winding. The circuit includes a resistance to stabilise the current. The oxidising efficiency of the arc is increased by magnetising one or both electrodes by means of a coil such as 5 enclosing the lower electrode outside the casing, or a coil such as 5a of larger diameter on the inner wall of the electrode chamber 9. Mica insulation is provided at 17, and other insulation at 24 and 26.

159,780. CEMENT MATERIALS, MAGNESITE AND THE LIKE, METHOD OF BURNING OR CALCINING—AND APPARATUS THEREFOR. A. Hauenschild, Vilmos, Gaszar 28, Buda Pest. Application date, April 28, 1920.

A kiln for burning cement material or magnesite is charged with material *F* supported on a mechanical hearth *A*, and the



159,780

fuel is supplied through an annular series of hoppers *D*, which discharge into the upper end of an annular fuel shoot *C*, which prevents the mixing of the fuel and raw material when charged into the kiln. The fuel and material descend through the kiln uniformly, the fuel maintaining its cylindrical form as at *E* when in contact with the material. Air is injected by the pipes *B* towards the fuel and all the heat generated by combustion is radiated on both sides into the material. Escape of gas through the shoot *C* is prevented by a cover *G* provided with fuel inlets. In an alternative form a rotating or travelling hopper may be provided which delivers to the several inlets as required.

159,802. MINERAL TAR OTHER THAN COAL TAR, PROCESS OF TREATING. W. A. Anderson, Inistore, Helensburgh, and J. Meikle, 14, Garrioch Drive, Maryhill, Glasgow. Application date, October 31, 1919.

Mineral tar or a mixture of coal tar pitch with a mineral oil or tar oil is injected into and through a tubular heater by an excess of superheated steam at such a temperature that an interaction takes place at 450°C.-600°C. The products are passed into an expansion chamber where carbon and bitumen are deposited, and then to a series of condensers in which oils are condensed. When crude Mexican petroleum is treated at 450°C.-500°C., bitumen having a melting point of 180°C., a condensable oil, and gas are obtained. The oil can be separated into a yellow resinous substance, an oil of density 0·910, and a light oil of density 0·880.

NOTE.—The following specifications, which are now accepted, were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 134,228 (E. De Haen, Chemische Fabrik List Ges.), relating to making filter elements, *see* Vol. II., p. 23; 135,855 (R. Fleming), relating to condensing distillates from oil-cracking stills, *see* Vol. II., p. 184; 137,513 (New Jersey Zinc Co.), relating to zinc oxide, *see* Vol. II., p. 311; 139,470 (Norske Aktieselskab for Elektrokemisk Industri Norsk Industri Hypotekbank), relating to removal of iron from aluminium nitrate, sulphate or chloride, *see* Vol. II., p. 511; 146,114 (Farbwerke vorm. Meister Lucius & Bruning), relating to methane, *see* Vol. III., p. 320; 149,927 (New Jersey Zinc Co.), relating to zinc oxide and lead sulphate furnaces, *see* Vol. III., p. 568; 152,643 (M. Zack), relating to magnetic separation of oxygen and nitrogen, *see* Vol. IV., p. 49.

International Specifications not yet Accepted

157,329. GLYOXAL. A. Wohl, 113, Hauptstrasse, Langfuhr, Dantzig, Germany, and K. Braunic, Zoppot, Germany. International Convention date, June 29, 1916.

Acetylene is mixed with an inert gas such as air, hydrogen, or carbon dioxide, and treated with ozone at ordinary temperature. If water vapour or spray is injected into the mixture, glyoxal is recovered as an aqueous solution.

157,380. BRIQUETTING COKE. C. E. Turnbull, 21, Alstertor, Hamburg, Germany. (Representative of J. Alexander, Altona-on-Elbe, Germany.) International Convention date, June 28, 1916.

Coke is briquetted with a mixture of pitch and thin liquid coal tar and/or the oils obtained from tar distillation. Other products which become liquid on heating may be added, such as brown coal or lignite tar, or tar from water gas, oil or rich gas; also primary coal tars or primary tars from brown coal and pitch tar, or oils from the distillation products from these tars. These binders coke when burned, and the briquette retains its shape.

157,401. FATS, &C., PURIFYING. E. I. Du Pont de Nemours & Co., Wilmington, Del., U.S.A. (Assignees of J. E. Booge, Wilmington, Del., U.S.A.) International Convention date, June 13, 1918.

To purify vegetable or animal oils such as polymerized or partly oxidised cotton seed oil, or soya bean oil, dry steam or inert gas is blown through the oil at atmospheric or reduced pressure and at a temperature of 105°C.-130°C.

LATEST NOTIFICATIONS.

160,747. Manufacture of oxalates and oxalic acid. OldburyElectro-Chemical Co. March 23, 1920.

160,754. Flotation process of fuel production. Bates, L. W. March 23, 1920.

160,758. Purification of blast furnace and like gases. Halkergerhütte Ges. March 23, 1920.

160,759. Production of aluminium chloride. Armour Fertiliser Works. March 24, 1920.

160,760. Process for the reduction of ores. Stevens, C. A. March 26, 1920.

160,765. Process for the manufacture of oxyaldehydes and their derivatives. Soc. Chemique Des Usines Du Rhone Anciennement Gilliard, P. Monnet, et Cartier. March 24, 1920.

160,777. Methods of converting wood into mucic acid and other products. Acree, S. F. March 25, 1920.

160,780. Self-lubricating anti-friction products. Bouvery, O. R., and Conort, F. P. March 26, 1920.

160,789. Process and apparatus for manufacture of hydrocarbons from carbonaceous substances such as coal or from distillation products thereof. Vielle, J. A., and Plauson, H. March 24, 1920.

Specifications Accepted, with Date of Application

139,803. Superphosphate of lime and similar compounds, Apparatus for the manufacture of. Chemical Construction Co. March 4, 1919.

143,891. Acetaldehyde from acetylene, Process for the manufacture of. Chemische Fabrik Griesheim Elektron. August 10, 1916.

144,604. Borneol, Manufacture of. Fabriques de Produits Chimiques de Thann et de Mulhouse. June 12, 1919.

145,058. Synthetic ammonia, Process for the production of the nitrogen-hydrogen mixture in. Badische Anilin & Soda Fabrik. July 2, 1915.

146,184. Electrolysers. R. Pechkranz. June 27, 1919.

146,430. Spent sulphite cellulose lyes, Manufacture of fat from. W. Jeroch and Reichsausschuss für pflanzliche und tierische Oele und Fette Ges. January 24, 1917.
156,562. Coke or carbon, Apparatus for the separation of, from slag or the like. Soc. Le Coke Industriel. January 7, 1920. Addition to 120,932.
160,185. Reactive acid liquor alcohols, esters and the like from olefine hydrocarbons, Process for the production of. E. C. R. Marks. (*New Jersey Testing Laboratories.*) April 22, 1919.
160,200. Hydrocarbon oils, Cracking of. R. C. Holes and F. T. Manley. October 8, 1919.
160,202. Gas manufacture. E. V. Hayes-Gratze. July 10, 1920.
160,225. Plastic masses, Manufacture of. H. Dreyfus. December 3, 1919.
160,231. Calcining magnesia, Electric furnaces for, and for similar purposes. F. S. Newall. December 9, 1919.
160,236. Hydrocarbons, Process of converting heavy into lighter. L. W. Goole. (*Universal Oil Products Co.*) December 12, 1919.
160,258. Phenolic bodies with aldehydic compounds, Condensation of. Vickers, Ltd., Ioco Rubber & Waterproofing Co., Ltd., and W. H. Nuttall. December 15, 1919.
160,395. White lead, Apparatus for the manufacture of. E. W. Dahl. July 2, 1920.

Applications for Patents

Black, J. S. Refining hydrocarbon oils, spirits, &c. March 30. 9,436.
Bonnard, L. H. Carbonizing furnaces or retorts. March 31. 9,646.
Brownlee, R. H. Synthetically-produced hydrocarbon oils. April 2. (United States, May 13, 1918.) 9,794.
Coles, S. O. Cowper-. Process for removing scale and oxide from metallic surfaces. March 29. 9,292.
Dossett, J. M. Crystallizing copper sulphate. March 31. 9,617.
Graefe, P. Apparatus for purifying air, gas, or vapour. March 29. 9,353.
Grün, A. Manufacture of butter-fat and lard. March 31. (Czecho-Slovakia, April 1, 1920.) 9,652.
Kestner Evaporator and Engineering Co., Ltd. Extraction of oils, fats, waxes, &c. April 1. 9,704.
Kime, F. P. J. Refining hydrocarbon oils, spirits, &c. March 30. 9,436.
Kliva Ges. Manufacture of fatty acids from hydrocarbons. March 30. 9,511.
Krogh, S. A. S. Recording analysing apparatus for automatic analysis of gases. March 30. 9,560.
Lawson, S. Refining hydrocarbon oils, spirits, &c. March 30. 9,436.
Morgan, T. Substitute for palm oil for tin-plate manufacture. March 29. 9,375.
Nielsen, H. Treatment of gases or vapours, &c. March 31. 9,653.
Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. Synthesis of ammonia. March 29. (France, March 30, 1920.). 9,382.
Soc. l'Azote Français. Manufacture of fertilizers. March 29. (Switzerland, March 29, 1920.) 9,372.

National By-Products

NATIONAL BY-PRODUCTS, LTD., has been registered as a private company, with a nominal capital of £5,000 in £1 shares, to acquire from the War Department or the Army Council or other proper authority the rights to acquire, develop and turn to account the waste products of all kinds (whether animal, vegetable or mineral) arising out of the supply to H.M. Forces of food, fodder and materials of all kinds; to acquire and deal with waste products from any other Government body or persons, to arrange for the transportation and shipping of waste and the products thereof, &c. The first directors are not named. The registered office is at Goschen Buildings, Henrietta Street, Strand, W.C.

Change of Address

HERBERT MORRIS, LTD., of Loughborough, inform us that their Sheffield branch office has been removed from Cairns Chambers, St. James Street, to more commodious premises at Montgomery Chambers, Hartshead, Sheffield. The telegraphic address and telephone number remain unchanged.

In their new offices, the firm state, this branch will be able to offer better service in the settlement of material-handling problems.

Chemical Matters in Parliament

Key Industries Bill

MR. LYLE-SAMUEL (House of Commons, April 4) asked the Prime Minister whether, in view of the passing of the German Reparation (Recovery) Act, it was still the intention of the Government to proceed with the Anti-Dumping Bill.

Sir P. Lloyd-Greame replying, said the answer was in the affirmative.

Lieut.-Commander Kenworthy asked whether this meant that all goods from Germany might have to pay a duty of 83⅓ per cent.? Was that the intention of the Government?

Sir P. Lloyd-Greame said the hon. member would have an opportunity of discussing this in a very short time.

Dyestuffs (Import Regulations) Act

Major Barnes (House of Commons, April 4) asked the President of the Board of Trade if he would state when the list of products prohibited under the Dyestuffs (Import Regulation) Bill would be published?

Sir P. Lloyd-Greame said the printed list of products coming within the scope of the Dyestuffs (Import Regulation) Act had been available to applicants since the 10th March. An announcement stating where copies could be obtained was issued to the Press and inserted in the Board of Trade Journal of the 10th March.

Imports from Germany

Lieut.-Colonel Sir J. Norton-Griffiths (House of Commons, April 4) asked the President of the Board of Trade the number of gas mantles imported from Germany into this country since the commencement of the year; and whether he was aware that the whole of the British gas-mantle industry was threatened with ruin owing to the importation of German gas mantles, which were sold in this country below the retail price in Germany?

Sir P. Lloyd-Greame: The number of incandescent gas mantles imported into the United Kingdom, consigned from Germany, registered during the period 1st January to 31st March, 1921, was 12,668 gross. Consideration has been given to the general position of the gas-mantle industry, and I am fully aware of its difficulties.

Financial Resolutions Postponed

Mr. Chamberlain (House of Commons, April 5) announced, in reply to a question, that the Government proposed to postpone the financial resolutions on the Key Industries Bill.

Mr. Lyle-Samuel asked on what day the resolutions would be taken.

Mr. Chamberlain replied that he could not name a day. The House would recognise that the progress of Government business was necessarily affected by the changes which had followed the illness of Mr. Bonar Law. The Chancellor of the Exchequer (Sir R. Horne) was overwhelmed with work and responsibility at the present time.

Arsenic for Brazil

ACCORDING to a telegram which has been received from His Majesty's Consul at Sao Paulo, the Brazilian Ministry of Agriculture is calling for tenders, to be submitted by April 20, for the delivery on June 30 of 1,000 kilogrammes of white arsenic with a minimum proportion of 98 per cent. arsenical acid, packed in iron drums of 50 kilogrammes weight each, and of 1,000 kilogrammes of Paris green with a minimum proportion of 57 per cent. of arsenical acid, to be packed in wooden or metal receptacles of 5 or 10 kilogrammes weight each.

Local representation is essential. Tenders should be addressed, Secretaria de Estado dos Negocios da Agriculturo Commercio e Obras Publicas, Largo do Palacio, Sao Paulo, Brazil.

MR. H. T. WATSON, consulting and chemical engineer and continuous rotary filter expert, of Fairfield-road, Widnes, has been appointed sole agent by the Binks Spray Equipment Co., of Chicago, for their acid-resisting chamber sprays, &c.

Monthly Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

THURSDAY, April 7.

There is unfortunately little improvement to report in the general demand for chemicals. There have perhaps been one or two slightly better patches, but the market remains practically dead.

There is no change to record in the export situation.

General Chemicals

ACETONE.—The demand has been rather quieter, but no change in price is reported.

ACID ACETIC is decidedly firmer and a better volume of business has gone through.

ACID CITRIC is unchanged and uninteresting.

ACID FORMIC has been in rather better enquiry and stocks on the spot have been reduced.

ACID OXALIC is slow of sale, but the undertone continues to be firmer.

ACID TARTARIC is weaker in price owing to further realisation of second-hand parcels.

BLEACHING POWDER is a drug on the market and little business is to be detected.

COPPER SULPHATE remains in an unsatisfactory position and the tendency is favourable to buyers.

FORMALDEHYDE.—Stocks are passing steadily into consumption at recent values.

LEAD ACETATE has been in rather better enquiry. The situation leaves much to be desired.

POTASH BICHROMATE is again lower in price in second-hands and little business is reported.

POTASH CAUSTIC.—No improvement in price is indicated, but at the same time the Reparation (Recovery) Act may be expected in due course to influence the price in an upward direction.

POTASH PRUSSIATE is not much enquired for. Stocks are moderate.

SODA ACETATE has been in slow demand. Value unchanged.

SODA BICHROMATE.—Forced realisation is apparent and until weak holders are eliminated, an improvement is unlikely.

SODA CAUSTIC remains featureless.

SODA HYPOSULPHITE is decidedly firmer in price and a moderate business is passing.

SODA NITRITE is very quiet but unchanged in value.

SODA PRUSSIATE has been enquired for on export account, but little business seems to have materialised.

Coal Tar Intermediates

There is little interest being taken in this market, and business continues without any outstanding features of interest.

ALPHANAPHTHYLAMINE continues steady at last quoted price.

ANILINE OIL AND SALT are without feature and the trade is depressed on account of lack of export demand.

BETA NAPHTHOL is passing slowly into consumption and price continues steady.

DIMETHYANILINE is inclined to be weak owing to lack of demand.

NAPHTHIONATE OF SODA is in fair request but the price is still weaker.

NITRO BENZOLE maintains its price and there is a steady business passing.

PARA TOLUIDINE has been in small request and the price is firm.

PARANITRANILINE is only in moderate demand at current figures.

PARAPHENYLENEDIAMINE is only in small request without change in value.

SALICYLIC ACID is steadier and there is a good demand in B.P. material.

Coal Tar Products

The prices mentioned in this report are mostly nominal in view of the present stoppage of the coal mines, which has made it necessary for many tar distillers to suspend delivery.

90's BENZOL is fairly scarce and is quoted at 2s. 10d. on rails in the north, and is selling at the same price in London. The price has an upward tendency, doubtless owing to short supply consequent on the coal strike.

PURE BENZOL is quoted at 2s. 11d. on rails in the north and 3s. in the South.

CREOSOTE OIL is quoted at 8s. ¾d. on rails in the North and 9¼d. in the South.

CRESYLIC ACID is still inactive and is worth about 2s. 6d. per gallon for pale, and 2s. 3d. to 2s. 4d. for dark quality.

SOLVENT NAPHTHA is worth from 1s. 11d. to 2s.

HEAVY NAPHTHA is quoted at 2s. 2d.

NAPHTHALENE is quiet at £9 to £14 per ton for crude, and £24 to £27 per ton for refined.

French Market Report

Business continues without feature, and quotations still continue to favour buyers.

The following are the leading figures noted :—

ACETONE, 530 frs.
ACID ACETIC, 400 frs. for 80 per cent.
ACID BORACIC, 425 frs.
ACID CITRIC, 15 frs. per kilo.
ACID LACTIC, 280 frs.
ACID OXALIC, 525 frs.
ACID TARTARIC, 13 frs. per kilo.
ALUM CHROME, 340 frs.
AMMONIUM CARBONATE, 250 frs.
ARSENIC, 280 frs.
AMMONIUM PHOSPHATE, 625 frs.
BARIUM CHLORIDE, 105 frs.
BLEACHING POWDER, 100 frs.
BORAX CRYSTALS, 180 frs.
CALCIUM CHLORIDE, 70 frs.
COPPER SULPHATE, 525 frs.
IRON SULPHATE, 31 frs.
LEAD ACETATE, 275 frs.
LEAD NITRATE, 325 frs.
POTASSIUM BICARBONATE, 100 frs.
POTASSIUM BICHROMATE, 550 frs.
POTASSIUM META BISULPHITE, 625 frs.
POTASSIUM YELLOW PRUSSIATE, 8 frs. per kilo.
SODIUM ACETATE, 110 frs.
SODIUM BICHROMATE, 350 frs.
SODIUM BISULPHITE, 50 frs.
SODIUM BISULPHITE SOLUTION, 50 frs.
SODIUM CAUSTIC 76 per cent., 125 frs.
SODIUM HYPOSULPHITE, 125 frs.
SODIUM META BISULPHITE, 175 frs.
SODIUM NITRITE, 330 frs.
SODIUM PHOSPHATE, 150 frs.
SODIUM YELLOW PRUSSIATE, 5.50 frs. per kilo.
SODIUM SILICATE, 55 frs.
SODIUM SULPHIDE CRYSTALS, 90 frs.

SODIUM SULPHIDE CONCENTRATED, 140 frs.
SODIUM SULPHITE, 150 frs.
ZINC SULPHATE, 100 frs.
All the above figures are per 100 kilos unless otherwise stated.

German Market Report

Business has been entirely upset owing to the recent trend of politics, and practically all export business to the Allies has ceased.

Import business has also been affected. The undertone remains fairly firm, but there is an uneasy tendency in all directions.

ACID CITRIC, 60 marks.
ACID OXALIC, 17 marks per kilo.
ACID SALICYLIC, 25 marks per kilo.
ALUM CHROME, 700 marks.
AMMONIUM CARBONATE, 500 marks.
BORAX, 8.50 marks per kilo.
COPPER SULPHATE, 625 marks.
IRON SULPHATE, 60 marks.
LITHOPONE, 4.25 marks per kilo.
POTASH PERMANGANATE, 28 marks.
POTASH YELLOW PRUSSIATE, 295 marks.
SODIUM BICARBONATE, 125 marks.
SODIUM NITRITE, 625 marks.
All the above quotations are per 100 kilos unless otherwise stated.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	6	to	0	2	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	95	0	0	to	100	0	0
Acid, Acetic, glacial, 99-100%	ton	70	0	0	to	72	0	0
Acetic, 80% pure	ton	53	0	0	to	54	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst	ton	69	0	0	to	70	0	0
Carbolic, cryst. 39-40%	lb.	0	0	9	to	0	0	9½
Citric	lb.	0	2	3½	to	0	2	5
Formic, 80%	ton	80	0	0	to	85	0	0
Gallic, pure	lb.	0	4	9	to	0	5	0
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol	ton	37	10	0	to	40	0	0
Lactic, 60 vol.	ton	42	10	0	to	45	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	0	10	to	0	0	11
Phosphoric, 1.5	ton	55	0	0	to	57	0	0
Pyrogallic, cryst	lb.	0	9	0	to	0	9	3
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb.	0	1	6	to	0	1	9
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	9	to	0	1	10
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	45	0	0	to	50	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	13	0	0	to	14	0	0
Aluminium, sulphate, 17-18%	ton	15	5	0	to	16	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	65	0	0	to	70	0	0
Ammonia, muriate (galvanisers)	ton	55	0	0	to	57	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	95	0	0	to	100	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	3
Amyl acetate	ton	420	0	0	to	425	0	0
Arsenic, white, powdered	ton	55	0	0	to	60	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	20	0	0	to	21	0	0
Nitrate	ton	55	0	0	to	56	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	20	0	0	to	21	0	0
Borax crystals	ton	34	0	0	to	36	0	0
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
,, Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	per ton	£ 90	s. 0	d. 0	to	£ 92	s. 0	d. 0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	35	0	0	to	37	0	0
Cream Tartar, 98-100%	ton	140	0	0	to	150	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	120	0	0	to	122	10	0
Formusol (Rongalite)	lb.	0	4	9	to	0	5	1
Glauber salts, commercial	ton	6	0	0	to	7	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	50	0	0	to	52	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	55	0	0	to	57	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	30	0	0	to	32	10	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	75	0	0	to	78	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	ton	145	0	0	to	150	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	48	0	0	to	50	0	0
Potassium bichromate	lb.	0	0	9½	to		—	
Carbonate, 90%	ton	55	0	0	to	60	0	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52%	ton	200	0	0	to	210	0	0
Nitrate, refined	ton	50	0	0	to	52	0	0
Permanganate	lb.	0	2	0	to	0	2	3
Prussiate, red	lb.	0	2	6	to	0	2	9
Prussiate, yellow.	lb.	0	1	6	to	0	1	7
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	3	15	0	to		—	
Seconds	cwt	3	10	0	to		—	
Sodium acetate	ton	35	0	0	to	37	10	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	7½	to	0	0	8
Bisulphite, 60-62%	ton	37	10	0	to	40	0	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	22	0	0	to	24	0	0
Nitrite, 96-98%	ton	50	0	0	to	52	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	8½	to	0	0	9
Sodium Sulphide, crystals	ton	20	0	0	to	23	0	0
Sulphide, solid, 60-62%	ton	40	0	0	to	41	0	0
Sulphite, cryst	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	90	0	0	to	95	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	2	3	to	0	2	6
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	4	6	to	0	4	9
Alphanaphthylamine	lb.	0	3	0	to	0	3	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Arthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	11	6	to	0	12	0

	per	£	s.	d.		£	s.	d.
Benzidine, sulphate	lb.	0	10	0	to	0	10	6
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	7	6	to	0	8	0
Betanaphthol	lb.	0	3	0	to	0	3	3
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	5	0	to	0	5	3
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	10	0	to	0	10	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	6	to	0	1	8
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	5	9	to	0	6	0
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	3	to	0	8	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
Resorcin, technical	lb.	0	7	6	to	0	8	6
Resorcin, pure	lb.	0	8	9	to	0	9	0
Salol	lb.	0	3	6	to	0	3	9
Sulphanilic acid, crude	lb.	0	1	8	to	0	1	9
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Metals and Ferro Alloys

The following prices are furnished by Messrs. Miles, Mole & Co., Ltd., 101, Leadenhall Street, London, E.C.

	per	£	s.	d.		£	s.	d.
Aluminium, 98-99%	ton	150	0	0	to	150	0	0
Antimony, English	ton	37	0	0	to	40	0	0
Copper, Best Selected	ton	69	0	0	to	71	0	0
Ferro-Chrome, 4-6%	ton	40	0	0	to	41	0	0
Ferro-Chrome Manganese, loose	ton	25	0	0	to	26	0	0
Silicon, 45-50%	ton	18	0	0	to	20	0	0
Tungsten, 75-80%	lb.	0	2	2	to	0	2	2
Lead Ingot	ton	20	5	0	to	20	5	0
Lead Sheets	ton	34	0	0	to	35	0	0
Nickel, 98-99%	ton	205	0	0	to	205	0	0
Tin	ton	161	10	0	to	161	10	0
Spelter	ton	25	5	0	to	25	5	0

Structural Steel

	Per	£	s.	d.		£	s.	d.
Angles and Tees	ton	20	0	0	to	21	0	0
Flats and Rounds	ton	20	0	0	to	22	0	0
Joists	ton	19	0	0	to	20	0	0
Plates	ton	20	0	0	to	20	0	0
Rails, heavy	ton	21	0	0	to	22	0	0
Sheets, 24 Gauge	ton	20	0	0	to	21	0	0
Galvanized Corrd. Sheets	ton	22	0	0	to	23	0	0
Zinc Sheets	ton	34	0	0	to	35	0	0

Cardiff By-Products

	CARDIFF, April 6.
Sulphate of Ammonia—	
For home consumption (per ton o.t.)	£24 11s.
For export (per ton f.o.b.)	£20 to £30
National Benzole (per gallon)	3s. to 3s. 6d.
Motor Benzol (per gallon)	3s. to 3s. 5d.
Crude Benzol (per gallon)	1s. 9d. to 2s.
Solvent Naphtha (per gallon)	2s. 5d. to 2s. 7d.
Heavy Naphtha (per gallon)	2s. 9d. to 2s. 11d.
Crude Naphthalene Salts (per ton)	£9 to £15
Pitch (per ton)	80s. to 100s.
Creosote (per gallon)	10d. to 1s.

Chemicals for Argentina

Increasing Demand for British Goods

IN a review of the Argentine market for industrial drugs and chemicals the Journal of the British Chamber of Commerce in the Argentine Republic states that an attractive and profitable trade is done in the Argentine market by European and American manufacturers.

There is, of course, a certain amount of competition from local manufacturers, but inasmuch as the total value of chemical imports during 1919 amounted to no less than approximately $35,000,000, there is evidently a good market for the United Kingdom at the present time. Not only so, but in view of the increasing industrial developments, Argentina should, in the future, offer a larger scope for the sale of British chemicals. From figures published in an American consular report it appears that the principal chemical imports into Argentina during 1919 were (in kilos) heavy tar oil, 2,008,057; paraffin oil, 3,944,137; sulphuric acid, 1,495,972; dilute acetic acid, 608,288; alum, 1,371,874; carbonate of soda crystal, 1,569,867; calcium carbide, 2,851,519; chloride of calcium, 1,919, 147; glucose, 2,474,110; common soap, 1,089,651; nitrate of soda, 1,241,168; rosin, 15,859,908; silicate of soda, 4,512,550; caustic soda, 6,542,906; soda ash, 3,459,303; sulphate of aluminium, 1,226,046; sulphate of barytes, impure, 1,237,194; sulphide of soda, impure, 1,514,507; varnishes, 1,036,174; colours, in lump or powder, 1,872,951; prepared colours, 4,085,583; crude sulphur, 7,167,741; sulphur in powder or in cylinders, 2,639,981; carbonate of lime, chalk, 2,080,521.

It is pointed out by those who have a knowledge of the Argentine market that direct dealing by the ultimate consumer with the factory would be impracticable in anything but specialities. Only those factories whose products are in extensive use or are augmented by purchases from other sources should have their own offices, other concerns appointing as distributors houses already well established and handling similar although non-competitive goods. Amply diversified stocks should be carried locally to supply small demands and to enable the merchant to take quick advantage of any unusual market condition, the larger orders being sent from the factory.

Buenos Aires would make an excellent distributing centre. Personal contact and delivery of the goods specified is the secret of success in the Argentine market, provided that the prices do not exceed those of other dealers. Only after long familiarity with the quality of the goods and upon the conviction that they will receive proper treatment from the company or its representative will people begin to insist upon a certain mark or brand.

It is suggested that as much liberality as possible be shown the representative who is fighting to build up a reputation for the manufacturers as well as for himself. A good agent though able to secure cash upon delivery from certain customers, will generally have to conform to the terms and conditions offered by competitors for similar goods. These terms at present vary from cash on delivery, cash on the first pay day of the following month, to 90 days credit. It is usual to quote a price on which there is 5 per cent. discount for immediate cash, and a discount of one per cent. less for each successive month over a five month period, at the end of which the entire amount is billed as due and payable.

Particular attention should be given to the question of weights and containers, especially in regard to materials such as rosin, acids, and paraffin, which are subject to unavoidable depreciation during transportation. Every lot should also adhere to a standard of appearance and quality. It is believed that with an understanding of the conditions of the market, British manufacturers should be able, not only to maintain a fair share of business but also to increase their trade in these lines.

MR. JOHN S. MACARTHUR, managing director of Blacklock, Macarthur, Ltd., died suddenly at his residence at Pollokshields on April 2. He was one of the founders of the Scottish Oil Paint, Colour and Varnish Association and of the National Federation of Associated Paint, Colour and Varnish Manufacturers of the United Kingdom.

Company News

VIRGINIA CAROLINA CHEMICAL CO.—The quarterly dividend of 2 per cent. ($2 per share) on the Preferred stock is payable on April 15.

TEAM BY-PRODUCT COKE.—Dividend of 3s. per share, less tax, for half-year, payable April 7, making 30 per cent. for the year (last year, 25 per cent. for the year). To be carried forward, £27,399.

ALIANZA NITRATE.—The net profit for the year to December 31 last amounts to £779,000, as against £67,444 for the previous year. A final dividend of 45 per cent. is recommended, bringing the total distribution up to 75 per cent., as compared with 10 per cent. for 1919. £691,000 to be carried forward.

MOND NICKEL CO.—B.S.T., LTD., having purchased £1,300,000, 8 per cent Mortgage Debenture stock of the company, are offering the same for sale at 98 per cent. Applications for £250,000, it is stated, have been received from underwriters, and will be accepted on the terms of the offer. The proceeds of the sale of stock will be applied in providing further working capital, redeeming the existing £500,000 6 per cent. Redeemable Debenture stock, paying off bank loans and completing the purchase of the share capital of Henry Wiggin & Co., Ltd.

A Stock Exchange announcement states that dealings in 60,718 new ordinary shares of £1 each, fully paid, Nos. 400,001 to 744,078, have been specially allowed by the Committee under Temporary Regulation 4 (3). These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted.

LEVER BROTHERS, LTD.—Dealings in the following securities have been specially allowed by the Stock Exchange Committee under Temporary Regulation 4 (3). These securities will rank *pari passu* with those in which special settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted: 447, seven per cent. preference shares of £1 each, fully paid, Nos. 23,555,194 to 23,555,640, and 226 eight per cent. "A" preference shares of £1 each fully paid, Nos. 15,466,387 to 15,466,612.

CORNWALL CHINA CLAYS.—A prospectus has been issued by the Cornwall China Clays, Ltd., offering for subscription 40,000 ordinary shares of £1 each at par. The Company has been formed to acquire and work certain leases comprising about 143 acres, including the work known as "Wheal Louisaland Hornick Sett." The china clay on the sett, the prospectus states, is of excellent quality. Trial pits have been put down over 20 acres of the area, and the sett has been opened out to a depth of 50 ft. The clay, it is stated, is suitable for use in the paper making, textile, and potting industries, as well as in the manufacture of chemicals. Of the proceeds of the present issue £35,000 will be available for working capital. The subscription list, which opened on Monday will close on or before April 21.

THE NIGER CO., LTD.—Lazard Brothers & Co., Ltd., announce that they have entered into an agreement with Lever Brothers, Ltd., acting on behalf of the holders of the recently issued £2,500,000 8 per cent. seven year notes of the Niger Co., by which these notes will be guaranteed both as to principal and interest by Lever Brothers, Ltd. It is understood that the guarantee is given in view of the fact that the proposals providing for the acquisition by Lever Brothers of ordinary shares in the African & Eastern Trade Corporation, Ltd., are not being proceeded with. The contemplated transfer of these shares will, therefore, not take place, although the transfer of the ordinary shares in Lever Brothers own West African companies will be carried out as arranged. Noteholders are invited to deposit their notes with Lazard Brothers & Co., Ltd., on or after April 11, for endorsement of the guarantee.

BRITISH OXYGEN CO.—Messrs. Higginson & Co., of Lombard Street, have been offering, on behalf of the company, £250,000 8 per cent. first mortgage debenture stock at 96 per cent. The company, the prospectus states, is the oldest commercial producer and distributor of oxygen in the world. The demand for oxygen for the cutting and welding of metals, it is stated, is constantly increasing, while the company also produces hydrogen and other gases for various purposes, and manufactures plant and apparatus connected with the production and use of its gas products. The debenture stock will be secured as a specific mortgage on the land, buildings, machinery, &c., and as a floating charge on the remainder of the company's assets, present and future. The net assets, excluding goodwill, patents, and trade marks, but including the net proceeds of this issue, amount to £1,103,475, and cover the present issue more than four times. The subscription list which opened on Monday morning was closed at midday the same day, the issue having been over-subscribed. It was announced that applications received by post from the country on Tuesday would be considered.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Toronto ...	Artificial silk yarns	393
Wellington	Glassware	398
Paris	Asbestos; vulcanised fibre ...	402
Barbados ...	Glassware	426
Cyprus ...	Chemical manures; crystallized soda	427
Milan... ...	Raw materials for soap; oils; starches	433
Milan... ...	Oils; fats	434
Geneva ...	China clay	439
Mexico ...	Chemicals	452
Panama ...	Drugs	453

Tariff Changes

FEDERATED MALAY STATES.—The exportation of china clay or Kaolin, potash felspar, or soda-felspar intended for use as a flux or glaze is prohibited.

ROUMANIA. The following modified export duties (all calculated on a wagon of 10 metric tons) are notified: Benzine, light. lei 11,000; benzine, heavy, lei 11,000; distilled petroleum, lei 4,000; light (lubricating) oils, lei 3,500; heavy (lubricating) oils, lei 7,000; and oilcake, lei 300.

SPAIN.—The duty of 2 pesetas per 100 kilogs on the export of linseed cake and other oilseed cakes is withdrawn. Export, however, is still subject to licence.

SWITZERLAND.—A Decree of the Swiss Federal Council provides *inter alia*, for the prohibition of the importation of industrial alcohol into Switzerland by private persons. The Alcohol Régie may (until the end of June) permit the importation of foreign alcohol, proved to have been contracted for prior to the enforcement of this Decree, subject to the payment of import duties and to denaturing. Alcohol for burning may be exported to foreign countries subject to permission for such export being obtained from the Régie.

According to a telegram which has been received in the Department of Overseas Trade from His Majesty's Minister at Sofia, the Bulgarian Ministry of Railways is calling for tenders to be submitted by May 9 for 1,000 TONS OF CREOSOTE AND 50 TONS OF CHLORIDE OF ZINC. Further details are being forwarded and will be available for inspection on receipt at the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W. 1. It is advisable that firms tendering should act either through their own agents in Bulgaria or through some merchant firm established there. The names of suitable firms are also available at the Department.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

CALLAGHER, J., and COWAN, R. J., carrying on business as the Freedom Soap Co., 81, Dale Street, Liverpool. By mutual consent, from March 21. All debts received and paid by R. J. Cowan, who will carry on the business under the style of The Freedom Soap Co.

MAGNUS, H., SMITH, S. J., carrying on business as metal welders, at 61-62, Water Street, Birmingham, under the style of Magnus Welding Co., by mutual consent as and from March 14, 1921.

PRATT, A. E., and ADAM, D., carrying on business as engineers and metallurgists, at 5, Chancery Lane, London, W.C.2, under the style of Arthur E. Pratt & Co., by mutual consent as from November 30. All debts received and paid by A. E. Pratt, who will in future carry on the business at the above address.

Companies Winding Up Voluntarily

MALAGA RED OXIDE CO., LTD.—Creditors' claims on or before May 14, to the Liquidator, J. W. Jones, of Howorth & Co., 19, Cooper Street, Manchester.

TRIPLEX SAFETY GLASS CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at the registered office of the company, 1, Albemarle Street, London, on Tuesday, April 12, at 12 noon. Creditors' claims on or before May 31 to the above address. W. Sinclair and A. W. Tait, Joint Liquidators.

Liquidators' Notices

CHORLEY BLEACHING CO., LTD.—A general meeting of members will be held at 36, Brazennose Street, Manchester, on Monday, May 9, at 11.15 a.m. A. Reid and C. R. Lymer, Joint Liquidators.

FLUORUNDUM FLAME CARBONS, LTD.—F. N. Clarke, 14, Pavilion Buildings, Brighton, Liquidator.

THE NORTH-WESTERN SALT CO., LTD.—A general meeting of members will be held at the offices of Messrs. Lonsdale & Marsh, 26, North John Street, Liverpool, on Wednesday, May 4, at 12 noon. H. Lonsdale, Liquidator.

THE PREMIER GLASS MANUFACTURING CO., LTD.—G. J. Harper, Liquidator.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]*

AJAX ANILINE DYE MANUFACTURING CO., LTD., London, E.C.—Reg. March 18, charge under Land Transfer Acts, to Coutts & Co. securing all moneys due or to become due to Coutts & Co.; charged on factory and caretaker's cottage. Verney Road, Peckham. *Nil. December 31, 1919.

LANCASHIRE AUTOMATIC GLASS MANUFACTURING CO., LTD., Manchester.—Reg. March 19, Trust Deed dated February 28, 1921, securing £75,000 first mortgage debenture stock; charged on land and buildings at Stretford, also general charge (except uncalled capital).

MARLEY HILL CHEMICAL CO., LTD., Newcastle-on-Tyne.—Reg. March 21, £5,000 debentures part of £100,000; general charge (except uncalled capital).

RADIUM & CHEMICAL CO., LTD., London, E.C.—Reg. March 19, £1,500 mortgage, to Lennox Foundry Co., Ltd., 3 & 5, Crown Court, Old Broad Street, E.C.; charged on British Radium Extraction Works, land, and other buildings at Elmers End. *Nil. January 25, 1921.

Satisfaction

NORTH BRITISH MANURE CO., LTD., Liverpool.—Satisfaction reg. March 23, £10,000, reg. December 29, 1911.

Bill of Sale

[The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.]

PALMER, W., 2, The Parade, Staines Road, Bedfont, oil and colourman. Filed March 30. £70.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

EDWARDS, J. M., 311, Fulham Palace Road, chemist. £15 12s. 8d. February 17.

HEX, J. R., and SHEPPERLEYS (London) Ltd., 43, Chancery Lane, London, manufacturing chemists. £20 13s. 10d. February 18.

GRAINGER, J. W., 6, St. Martin's Court, Newgate Street, Newcastle-on-Tyne. chemist, £10 3s. 8d. February 24.

GREEN, C., 42, Kew Road, Richmond, colourman. £32 9s. 6d. February 17.

Government Contracts

THE following are among the Government contracts let during February :—

ADMIRALTY.—*Air Filter :* Heenan & Froude, Manchester. *Rotary Strainer :* Worthington-Simpson, Ltd., Birmingham. *Thermometers :* T. E. Thomson & Co., London, E.C.

WAR OFFICE.—*Bridge Meggers :* Evershed & Vignoles, Ltd., Chiswick. *Chloride of Lime :* Castner-Kellner Alkali Co., Ltd., Liverpool. *Oxygen :* British Oxygen Co., Ltd., London. *Paint Ground in Oil :* Cookson & Co., London, E.C. *Pitch :* Rylance & Sons, Liverpool. *Scientific Instruments :* T. Hamblin, Ltd., London.

AIR MINISTRY.—*Aviation Spirit :* Shell Mex, Ltd., London, W.C. *Caustic Soda :* Castner-Kellner Alkali Co., Ltd., Liverpool; East Lancashire Chemical Co., Ltd., Manchester. *Ferro Silicon :* Allen Liversedge, Ltd., London, S.W. *Furnace Fuel Oil :* Anglo-American Oil Co., Ltd., London, S.W. *Petrol Storage :* Oil Storage and Equipment Co., London; Bywater & Co., London, W.C.

HIGH COMMISSIONER FOR INDIA.—*Chloroform :* Duncan, Flockhart & Co., Edinburgh. *Cresol :* Jeyes Sanitary Compounds, Ltd., London, E.C. *Crucibles :* Morgan Crucible Co., Ltd., London, S.W. *Fuchsine :* Blackwood & Co., Ltd., London, E.C. *Salamac :* Brunner, Mond & Co., Ltd., Northwich, Cheshire. *Stills, Copper :* Blair, Campbell & McLean, Ltd., Glasgow. *Sulphate of Copper :* G. Boor & Co., London, E.C.

CROWN AGENTS FOR THE COLONIES.—*Filters :* Br. Pasteur Chamberland Filter Co., London, E.C. *Laboratory Fittings :* Baird & Tatlock, London, E.C. *Novarsenobillon :* May & Baker, Ltd., Battersea. *Steriliser :* Manlove, Alliott & Co., Ltd, London, S.W.

A. BOAKE ROBERTS & CO., LTD., of Carpenters Road, Stratford, E. 15, are about to establish a Canadian manufacturing and distribution agency under the direction of Mr. E. T. Sterne, of Brantford, Ontario, who recently returned to Canada from England.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2 :—

ASTON (W.) & CO., LTD., 27, Montague Street, Worthing, Sussex. Chemists and druggists. Nominal capital, £12,000 in 12,000 shares of £1 each. Directors : W. Aston, F. W. Roberts, W. E. Martin. Qualification of directors. £100.

CHEMICALS & PIGMENTS, LTD.—Merchants and manufacturers of pigments and colouring materials. Nominal capital, £500 in 500 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, one share. Subscribers : H. H. Walton, M. H. Jones.

FLEMING (S.) & CO., LTD., 47, Mark Lane, E.C. Chemical manufacturers and merchants. Nominal capital, £3,000 in 2,000 ordinary shares and 1,000 seven per cent. preference shares of £1 each. Directors to be appointed by subscribers. Qualifications of directors, one share.

HEWETT & SONS, LTD., 36, St. Georges Road, Kemp Town, Brighton. Chemists, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors : H. S. Hewett, H. S. Saunders. Qualification of directors, one share.

LONDON ENGRAVING CO., LTD., 120, Cheapside, E.C.2. Chemical engravers and engravers. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors : H. T. Dickinson (per. director). Qualification of directors : Per. director, 250 shares.

PAROS, LTD., 242, Cable Street, E.1. Manufacturers of rubber. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors : W. Paros, N. Paros, I. Paros. Qualification of directors, one share. Per. director, £1,000.

ZINC OXIDE, LTD., Station Road, Hayes, Middlesex. Manufacturers of chemicals. Nominal capital, £12,000 in 12,000 shares of £1 each. Directors : J. W. Bailey, W. V. Lyon, H. Simm, C. C. Spalding. Qualification of directors, one share.

Chemical Workers' Wages

FOR weeks past it has been evident that a reduction in the wages of chemical workers was inevitable. Short time, the restriction of output, and even the closing of some works, have not sufficed to enable production to be carried on in a way profitable to manufacturers.

At the Widnes works of the United Alkali Co., Ltd., states a CHEMICAL AGE correspondent, notices of reductions in wages have been posted. The official notification reads :—"In consequence of the deplorable conditions of industry, and also in view of the decrease in the cost of living, a reduction in the wages of our process men, labourers and others, is absolutely imperative. Notice has, therefore, been given by the company to the trade union representatives that those workers whose wages have hitherto followed the chemical trade awards, will be reduced on and after the 31st March, 1921, that being Thursday, the beginning of the pay week, to the extent of the amount granted by the last award of the Industrial Court, dated 4th Jan., 1921, and by the previous advance agreed to by the Chemical Trade Joint Industrial Council, at their meeting in London on the 30th March, 1920, for male workers, and on the 17th June, 1920, for female workers." The details of the agreements involved are then given.

The notice states that it is with much regret that the directors have decided on this course, but the deplorable conditions and prospects of trade have already compelled them to close many of their works and to pay off a considerable proportion of their men, and it is in the hope of avoiding any further stoppage of plant with a resulting increase of unemployment that they have been compelled to take this step.

H.M. Consul at Newchwany reports that BRITISH DYES DO NOT SELL READILY in Manchuria on account of their not being suited to the local water.

Are you

a regular subscriber to this journal?
If not, fill in the form below and post this entire advt. to-day

Subscription, U.K. 21/-

Abroad 26/- yearly.

To the Subscription Manager

BENN BROTHERS, LTD.
8, Bouverie Street, E.C.4.

I enclose £.....for which sum you will post the "Chemical Age" to me regularly each week for one year.

Signed .....

.....

Date .....

OZONE APPARATUS FOR ALL PURPOSES.
Q-OZONE PROCESSES, Ltd., 17, Victoria St., S.W.1

Contractors to H.M. Government.
ESTD. 1837. Tel. Address: "WIRECLOTH, GLASGOW."
ALEX. ROWAT & CO., Ltd.,
60, GALLOWGATE, GLASGOW.
Makers of Wirework and Wirecloth of every description
For Screening, Straining, Sifting and Drying purposes: also Strong Flexible Steel Wire Belts for Hoists, Elevators, Conveyors, etc.
Enquiries with particulars promptly attended to. (2)

TWO NEW BOOKS FOR MANAGERS & ENGINEERS

BENZOL A new book by S. E. WHITEHEAD, dealing with Benzol—its Recovery, Rectification, and Use. 210 pages, 8¾in.×5½. With introduction by the RT. HON. LORD MOULTON. Price **13/3**, post free.

COMPARATIVE THERM TABLES By H. R. ASKEW. Gives detailed Comparative Tables shewing Conversions based on the 1920 Gas Act. Price **5/6**, post free.

BENN BROTHERS LTD.
8 BOUVERIE STREET, LONDON, EC4